SOIL SURVEY OF

Cherokee, Gilmer, and Pickens Counties, Georgia

United States Department of Agriculture
Soil Conservation Service and Forest Service
In cooperation with
University of Georgia, College of Agriculture
Agricultural Experiment Stations

Issued September 1973

Major fieldwork for this soil survey was done in the period 1962–66. Soil names and descriptions were approved in 1967. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1967. This survey was made cooperatively by the Soil Conservation Service, the Forest Service, and the University of Georgia, College of Agriculture, Agricultural Experiment Stations. It is part of the technical assistance furnished to the Limestone Valley Soil and Water Conservation District.

Either enlarged or reduced copies of the soil map in this publication can be made by commercial photographers, or they can be purchased on individual order from the Cartographic Division, Soil Conservation Service, United States Department of Agriculture, Washington, D.C. 20250.

HOW TO USE THIS SOIL SURVEY

THIS SURVEY contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils of Cherokee, Gilmer, and Pickens Counties are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all the soils of the three counties in alphabetic order by map symbol. It shows the capability classification for each soil and also shows the page where each soil is described.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the capability units.

Foresters and others can refer to the section "Use of the Soils for Woodland." A table in this section shows groupings of soils according to their suitability for trees.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Use of the Soils for Wildlife Habitat."

Community planners and others can read about soil properties that affect the choice of homesites, industrial sites, and recreation areas in the section "Town and Country Planning."

Engineers and builders can find under "Use of the Soils in Engineering" tables that contain test data, estimates of soil properties, and information about soil features that affect engineering practices.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Cherokee, Gilmer, and Pickens Counties may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "Additional Facts About the Counties."

Cover: **Fescue pasture on Madison fine sandy loam, 10 to 15 percent slopes. Farm pond in area of Chewacla-Cartecay complex.**

U.S. GOVERNMENT PRINTING OFFICE: 1973

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402

Contents

Issued September 1973

SOIL SURVEY OF CHEROKEE, GILMER, AND PICKENS COUNTIES, GEORGIA

BY DAN H. JORDAN, GLENN L. BRAMLETT, GENE A. GAITHER, RAY J. TATE, MARION M. BLEVINS, AND JAMES O. MURPHY, SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE AND FOREST SERVICE, IN COOPERATION WITH THE UNIVERSITY OF GEORGIA, COLLEGE OF AGRICULTURE, AGRICULTURAL EXPERIMENT STATIONS

CHEROKEE, GILMER, and PICKENS COUNTIES are in the north-central and slightly western parts of Georgia (fig. 1). The total area is 1,078 square miles, or 689,920 acres. Cherokee County has a total area of 264,960 acres, Gilmer County, 280,960 acres, and Pickens County, 144,000 acres. The landscape is one of irregular rolling ridges to hilly mountains and a few high mountain peaks.

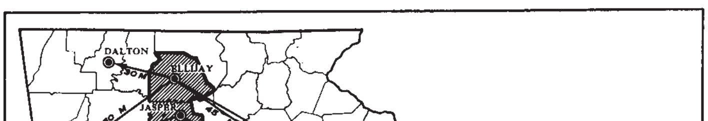

Figure 1.—**Location of Cherokee, Gilmer, and Pickens Counties in Georgia.**

All the survey area except the southern part of Cherokee County, which is densely populated, is suitable for farming and woodland. About 82 percent of the acreage is wooded. The smoother slopes are used for general farming, and the flood plains are used for pasture. Corn, the most extensive crop, is grown for food and for livestock feed. Truck cropping is fairly extensive in Gilmer County. Fine quality apples, one of the major cash crops, are also grown in Gilmer County.

The potential is high for development of wildlife habitat and recreational facilities in areas around Allatoona Lake, which is in the southwestern part of Cherokee County, and Carters Lake, in the southwestern part of Gilmer County. There are also choice sites for recreational facilities in the mountainous parts of Gilmer and Pickens Counties. The climate is comfortable, and water resources are unlimited.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in Cherokee, Gilmer, and Pickens Counties, where they are located, and how they can be used. The soil scientists went into the counties knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes, the sizes and speed of streams, the kinds of native plants or crops, the kinds of rock, and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Hayesville and Madison, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Madison fine sandy loam, 2 to 6 percent slopes, is one of several phases within the Madison series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map in the back of this publication was prepared from the aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. Two such kinds of mapping units are shown on the soil map of this survey area: soil complexes and undifferentiated groups.

A soil complex consists of areas of two or more soils, so intermingled or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. The name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Chewacla-Cartecay complex is an example.

An undifferentiated group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, or of two or more. The name of an undifferentiated group consists of the names of the dominant soils, joined by "and." Ashe and Edneyville stony loams, 10 to 25 percent slopes, is an example.

In most areas surveyed there are places where the soil material is so rocky, so shallow, or so severely eroded that it cannot be classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and are given descriptive names. Rock land is a land type in the survey area.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soil in other places are assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil. Yields under defined management are estimated for all the soils.

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in such a way as to be readily useful to different groups of users, among them farmers, managers of woodland and rangeland, and engineers.

On the basis of yield and practice tables and other data, the soil scientists set up trial groups. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others, then adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Cherokee, Gilmer, and Pickens Counties. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in the three counties, who want to compare different parts of the three counties, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area, or in planning engineering works, recreational facilities, and community developments. It is not a suitable map for planning the management of a farm or field, or for selecting the exact location of a road, building, or similar structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

The soil associations in the survey area are described in the following pages. One of the associations consists of nearly level soils on stream flood plains, and one of moderately steep soils on uplands. Three consist of very gently sloping and gently sloping soils on uplands and terraces, and five of steep and very steep soils on uplands.

Nearly Level Soils on Stream Flood Plains

These soils are on flood plains along the Etowah River and other larger streams. They are nearly level, mainly loamy or sandy, and generally mottled olive brown, light brownish gray, yellowish brown, and light gray. They formed in alluvial sediments washed from upland soils. These soils are in association 1.

1. Chewacla-Cartecay-Toccoa association

Somewhat poorly drained to well-drained, nearly level soils that formed in alluvium

This association consists of soils on narrow to fairly broad flood plains. These soils are along creeks and rivers subject to frequent or occasional flooding. Wet spots occur in some places. Streams generally have well defined channels. Depth to the water table ranges from about 14 to 40 inches in most areas.

This association generally occurs throughout the three counties. It occupies about 5 percent of the total acreage. It is about 52 percent Chewacla and Cartecay soils, 25 percent Toccoa soils, and 23 percent minor soils.

Chewacla soils are somewhat poorly drained. Their surface layer is dark grayish-brown loam about 8 inches thick. Their subsoil is clay loam and loam about 26 inches thick. It is olive brown in the upper part and light olive brown mottled with light brownish gray and brownish yellow in the lower part. Below the subsoil, to a depth of about 48 inches, is olive-gray sandy loam.

Cartecay soils are moderately well drained to somewhat poorly drained. They have a surface layer of dark-brown loam about 9 inches thick. Below is yellowish-brown loam that is mottled with dark brown and is about 9 inches thick. The next layer, about 22 inches thick, is pale-brown sandy loam mottled with yellowish brown and light gray. Below this, to a depth of about 54 inches, is gray, stratified sand and loamy sand.

Toccoa soils are well drained. Their surface layer is brown fine sandy loam about 6 inches thick. Below this is yellowish-brown, stratified fine sandy loam about 36 inches thick. The next layer, to a depth of about 54 inches, is yellowish-brown gravelly fine sandy loam.

Minor soils in this association are the gray, poorly drained Wehadkee and Worsham soils, the excessively drained Buncombe soils, the somewhat poorly drained Augusta soils, all of which are on flood plains or stream terraces, and the well-drained Masada soils at the higher elevations.

More than half the acreage is pastured or cultivated; the rest is wooded. Suitability of the soils for crops varies because of wetness and flooding. The well-drained soils are well suited to a wide range of grasses and crops, for example, corn, grain sorghum, soybeans, and truck crops. The somewhat poorly drained soils are better suited to pasture and to a row crop, such as corn, than to other uses. The poorly drained soils are too wet for cultivated crops and are limited in use for pasture and hay crops. Wet areas need to be drained before they can be used for pasture and cultivated crops.

These soils have severe limitations for residential or industrial development and other nonfarm uses. They require extensive site preparation, such as drainage, filling, and smoothing for foundations.

Most areas can be developed for wildlife habitat.

Chiefly Very Gently Sloping and Gently Sloping Soils on Uplands and Terraces

These soils occur mainly on upland ridgetops and to a lesser extent on terraces. Slopes are predominantly 2 to 10 percent but range to 15 percent. The soils chiefly have a dark-red, red, yellowish-red, or yellowish-brown, clayey or loamy subsoil. In most places the upland soils formed in material weathered from granite, gneiss, schist, biotite, and hornblende; in others they formed in terrace deposits. Associations 2, 3, and 4 make up this group.

2. *Wickham-Masada-Hiwassee association*

Well-drained soils that have a yellowish-brown to dusky red, loamy and clayey subsoil; on terraces

This association is characterized by nearly level to gently sloping soils on terraces and a few short, discontinuous escarpments. In most of the association, slopes are uniform and range from 2 to 10 percent, but they are more than 10 percent in some areas.

This association generally occurs throughout the survey area near or along the major creeks and rivers. It makes up about 2 percent of the total acreage. It is about 40 percent Wickham soils, 40 percent Masada soils, 15 percent Hiwassee soils, and 5 percent minor soils.

Wickham soils have a surface layer of dark yellowish-brown fine sandy loam about 7 inches thick. Their subsoil is yellowish-red and reddish-yellow sandy clay loam and clay loam that extend to a depth of about 66 inches. Below this, to a depth of 72 inches, is reddish-yellow gravelly sandy material.

Masada soils have a 9-inch surface layer that is dark grayish-brown fine sandy loam in the upper 6 inches and yellowish-brown sandy clay loam in the lower 3 inches. Their subsoil is mottled yellowish-brown, brownish-yellow, and strong-brown clay loam. It extends to a depth of about 50 inches. The lower part is mottled with reddish yellow. Below this, to a depth of about 60 inches, is mottled pale-yellow, white, and brown loamy material.

Hiwassee soils have a surface layer that is very dusky red loam in the uppermost 6 inches and dark reddish-brown clay loam below. Their subsoil is dusky red clay to clay loam that extends to a depth of 6 feet or more.

Minor in this association are the Cartecay, Chewacla, Toccoa, and Starr soils on bottom land.

About half of this association is cultivated or pastured. The strongly sloping soils and the soils on escarpments are in hardwoods and mixed pines. The major soils are well suited to general farming. They are better suited to row crops than most of the other upland soils in the survey area. Corn, small grain, sorghum, tall fescue, white clover, and bermudagrass are the crops commonly grown.

The soils in this association have slight to moderate limitations for foundations, septic tank filter fields, streets, campsites, and other nonfarm uses.

3. *Hayesville-Madison association*

Well-drained soils that have a yellowish-red and red, clayey and loamy subsoil; on narrow ridgetops of uplands

This association consists of well-drained, very gently sloping to gently sloping soils on narrow ridgetops. It generally occurs in the lower part of Gilmer County and throughout Cherokee and Pickens Counties. In most areas slopes are 6 to 10 percent, but they are 2 to 15 percent in some areas.

This association occupies about 7 percent of the total acreage. It is about 46 percent Hayesville soils, 36 percent Madison soils, and 18 percent minor soils.

Hayesville soils have a surface layer of fine sandy loam about 7 inches thick. It is dark grayish brown in the upper part and strong brown in the lower part. The subsoil is yellowish-red to red clay or clay loam that extends to a depth of about 35 inches. Below the subsoil, to a depth of about 60 inches, is mainly saprolite weathered from mica-gneiss.

Madison soils have a surface layer of dark-brown fine sandy loam about 6 inches thick. The subsoil is red clay loam and sandy clay loam that extend to a depth of about 27 inches. Below is a 6-inch layer of red sandy clay loam underlain by reddish-brown saprolite high in mica content. This material extends to a depth of 42 inches or more.

Also in this association are the well-drained Grover, Appling, and Tallapoosa soils. Grover and Appling soils have a loamy and clayey subsoil. They are deeper and more clayey than Tallapoosa soils. Alluvial soils occupy small areas along drainageways.

About 75 percent of this association is woodland, mostly mixed stands of hardwood and pine. Virginia pine, shortleaf pine, and a few loblolly pine grow in naturally reforested areas. Loblolly pine also occurs in planted stands. About 15 percent of the acreage, mainly along draws and drainageways, is used for pasture. Cultivated areas are widely scattered and make up the rest of the association. Corn, grain sorghum, and hay are grown chiefly for use on farms. Commercial truck crops, including cabbage, beans, and fine-quality apples, are produced on this association in Gilmer County.

The major soils in this association have slight to moderate limitations if used for residences, light industries, trafficways, and similar nonfarm purposes.

4. Gwinnett-Hayesville-Madison association

Well-drained soils that have mainly a dark-red to red clay and clay loam subsoil; on fairly broad interstream divides

This association consists of well-drained, very gently sloping and gently sloping soils on fairly broad interstream divides. In slightly less than half the association, slopes are 2 to 6 percent, and in the rest they are 6 to 10 percent.

This association makes up about 4 percent of the survey area. It occupies several tracts near Woodstock, mainly in the southern part of Cherokee County. It is about 55 percent Gwinnett soils, 20 percent Hayesville soils, 15 percent Madison soils, and 10 percent minor soils.

Gwinnett soils have a surface layer of dark reddish-brown loam about 6 inches thick. The subsoil, about 30 inches thick, is dark-red clay and clay loam. Below the subsoil, to a depth of 52 inches, is mainly broken and weathered rock.

Hayesville soils have a surface layer of fine sandy loam about 7 inches thick. It is dark grayish brown in the upper part and strong brown below. The subsoil is yellowish-red to red clay or clay loam that extends to a depth of about 35 inches. Below the subsoil, to a depth of about 60 inches, is mainly saprolite weathered from mica-gneiss.

Madison soils have a surface layer of dark-brown to yellowish-brown fine sandy loam about 6 inches thick. Their subsoil is red clay loam and sandy clay loam that extend to a depth of about 27 inches. It is underlain by a 6-inch layer of red sandy clay loam. Below this is reddish-brown saprolite high in mica content. This material extends to a depth of 42 inches or more.

Minor soils are the deep, well drained Appling soils, the moderately well drained Helena soils, and the shallow Wilkes soils.

Most of this association is eroded. In places all the original surface layer has been washed away and the dark-red to yellowish-red subsoil is exposed. Rills and shallow gullies are common.

Most of this association is in small farms that are worked on a part-time basis. The major soils are moderately well suited to farming and to many nonfarm uses. They have slight to moderate limitations for residences, picnic grounds, and trafficways and severe limitations for sewage lagoons and similar uses.

Moderately Steep Soils on Uplands

One soil association consists of moderately steep soils. Slopes are short and range from about 10 to 25 percent. These soils have a dominantly yellowish-red, red, and dark-red subsoil that ranges from loamy to clayey. They formed in material weathered from rock, such as gneiss, biotite, hornblende, granite, and schist. They are in association 5.

5. Hayesville-Gwinnett-Musella association

Chiefly moderately steep soils that have a dark-red to red, clayey and loamy subsoil; on uplands

This association is characterized by moderately steep soils on short side slopes dissected by narrow, well-defined drainageways. In most areas slopes are 10 to 25 percent.

This association occupies about 7 percent of the survey area, in several tracts, mainly south of the Etowah River in Cherokee County. It is about 58 percent Hayesville soils, 20 percent Gwinnett soils, 8 percent Musella soils, and 14 percent minor soils.

Hayesville soils have a surface layer of dark grayish-brown to yellowish-red fine sandy loam about 3 to 6 inches thick. Their subsoil extends to a depth of about 35 inches and is yellowish-red to red clay or clay loam. Below this, to a depth of about 60 inches, is mainly saprolite weathered from mica-gneiss.

Gwinnett soils have a surface layer of dark reddish-brown loam about 6 inches thick. Their subsoil is dark-red clay and clay loam about 30 inches thick. Below the subsoil, to a depth of 52 inches, is mainly broken and weathered rock.

Musella soils have a surface layer of dark reddish-brown cobbly loam about 6 inches thick. Their subsoil is dark-red cobbly loam that extends to a depth of about 48 inches.

Minor soils in this association are the shallow Tallapoosa and Wilkes soils, the micaceous Madison soils, the moderately well drained Helena soils, and the alluvial Cartecay and Chewacla soils.

Most of this association is eroded, and in some places all the original surface layer has been washed away and the reddish subsoil is exposed. There are shallow gullies and a few deep gullies. The less steep soils, as well as the adjacent draws, that once were cropped are now mostly in pine forest or improved pasture. The steeper and shallower soils that have never been cleared have a cover of mixed hardwoods and pines. Most of the farms in this association are small and are worked on a part-time basis.

The major soils of this association have severe limitations if used for sewage lagoons, playgrounds, and sites for light industry. Limitations for campsites are moderate to severe.

Chiefly Steep to Very Steep Soils on Uplands

These are steep to very steep soils mainly on wooded hillsides and mountains. Slopes range from 15 to 80 percent. The subsoil is dominantly red, yellowish red, dark yellowish brown, and yellowish brown and is clayey to loamy. In most areas there are coarse fragments on the surface. The soils formed in material weathered from rock, such as gneiss, mica, schist, and granite. They are in associations 6, 7, 8, 9, and 10.

6. *Tallapoosa-Madison-Hayesville association*

Chiefly steep to very steep, cobbly soils that have a yellowish-red to red, loamy and clayey subsoil; on upland hillsides

This association occupies short and long hillsides and is dissected by many narrow, well-defined drainageways. Many stony, cobbly, and gravelly rock fragments are on the surface and throughout the solum. Most of the soils are very steep. Slopes generally range from 15 to 60 percent but are 10 to 15 percent in some areas.

This association makes up about 45 percent of the survey area; it is the largest association in the three counties. It occupies the northern part of Cherokee County and scattered areas generally throughout parts of Pickens and Gilmer Counties. It is about 70 percent Tallapoosa soils, 8 percent Madison soils, 7 percent Hayesville soils, and 15 percent minor soils.

Tallapoosa soils occur in the steeper areas. Their surface layer is brown fine sandy loam about 3 inches thick. It is underlain by about 7 inches of strong-brown fine sandy loam. The subsoil, about 8 inches thick, is yellowish-red silty clay loam. Below this, to a depth of 26 inches or more, is mica-schist and gneiss-saprolite. This material protrudes upward into the subsoil. Channery and cobbly fragments occur in most areas.

Madison soils are on the narrow ridgetops and in a few of the less sloping areas. Their surface layer is dark-brown to reddish-brown fine sandy loam about 6 inches thick. Their subsoil is red clay loam and sandy clay loam that extends to a depth of about 27 inches. Below this is a 6-inch layer of red sandy clay loam underlain by reddish-brown saprolite that is high in mica content. This material extends to a depth of 42 inches or more.

The Hayesville soils are on narrow ridgetops and hillsides. Their surface layer about 6 inches thick is dark grayish-brown fine sandy loam to yellowish-red sandy clay loam. The subsoil is yellowish-red to red clay or clay loam that extends to a depth of about 35 inches Below this, to a depth of about 60 inches, is mainly saprolite weathered from mica-gneiss.

Minor in this association are the Talladega, Starr, Toccoa, Cartecay, and Chewacla soils. The steep Talladega soils make up the more sloping parts of the landscape. The well-drained Starr soils are along the narrow drainageways. The Toccoa, Chewacla, and Cartecay soils are on narrow flood plains along streams.

In some places the soils are eroded; most of the original surface layer has been washed away, the reddish subsoil is exposed, and rills and gullies have formed. These eroded areas were cultivated, but are now mostly in pine forest and improved pasture. The very steep, rocky areas, which have never been cultivated, are in mixed hardwoods and scattered pines. This association is mostly under woodland management by farmers and pulpwood companies. Individual farms generally are about 100 acres in size.

The major soils in this association have severe limitations if used for homesites, sites for light industry, and sewage lagoons. Limitations are moderate to severe for campsites, picnic grounds, and other recreational uses.

7. *Talladega-Tallapoosa association*

Chiefly steep and very steep, shallow, channery and cobbly soils that have a yellowish-red, loamy subsoil; on hills and low mountains

This association is characterized by mountain peaks, a mass of irregularly shaped mountains, high hills, and long, crooked drains that form deep narrow hollows. The elevation is about 1,200 to 2,000 feet. In most areas there are channery, flaggy, or cobbly fragments scattered on the surface. In about two-thirds of the association, slopes range from 25 to 80 percent but are 10 to 25 percent in some areas.

This association makes up about 12 percent of the survey area. It is about 55 percent Talladega soils, 40 percent Tallapoosa soils, and 5 percent minor soils. It is mainly at the northwestern tip of Cherokee County, but it extends along the western edge and into the central part of Pickens County and occurs in the western half of Gilmer County.

Talladega soils have a surface layer of channery loam, about 2 inches thick, that is underlain by dark yellowish-brown channery loam about 7 inches thick. The subsoil is yellowish-red channery clay loam or silty clay loam that extends to a depth of about 22 inches. It overlies thinly bedded rock and loamy material. Bedrock is at a depth of about 26 inches.

The surface layer of Tallapoosa soils is brown fine sandy loam in the upper 3 inches and strong-brown fine sandy loam below. The subsoil, about 8 inches thick, is yellowish-red silty clay loam. Below the subsoil, to a depth of 26 inches or more, is soft mica-schist and gneiss-saprolite. This material protrudes upward into the subsoil.

Minor in this association are the Hayesville, Tusquitee, and Madison soils. They occur as small, widely scattered areas. Hayesville and Madison soils are on the wider hilltops and ridges and on the lesser slopes, and Tusquitee soils are at the base of slopes and in colluvial draws.

About 3 percent of the acreage is used for cultivated crops, mainly corn, truck crops, and pasture. The rest is woodland. The native vegetation consists of mixed hardwoods and scattered shortleaf pine, Virginia pine, white pine, and loblolly pine.

Except for the less sloping areas of the colluvial draws and the narrow flood plains, this association is not suited to cultivated crops or pasture. The shallow root zone and steep slopes make the major soils unfavorable for farming. Trees grow moderately well. This association could be developed for recreational activities, such as hunting, hiking, and camping. Many of the draws are favorable sites for ponds.

These soils have severe limitations for most nonfarm purposes.

8. *Dekalb association*

Chiefly steep, stony, and flaggy soils that have a yellowish-brown and reddish-yellow, loamy subsoil; on Pine Log and Henderson Mountains

This association consists of stony and flaggy, loamy soils on mountains that rise abruptly from about 1,200 to 2,300 feet. The ridgetops are narrow, except for a fairly broad area on the southwestern side of Henderson Mountain. The long slopes are cut by narrow, shallow draws that are parallel to the direction of the slope. In nearly two-thirds of the association, slopes range from 25 to 60 percent; the rest is mainly 10 to 25 percent. There are many rock outcrops. This association extends in a north-northeasterly direction from the extreme northwestern part of Cherokee County into the south-central part of Pickens County.

This association occupies about 4 percent of the total acreage in the three counties. Dekalb soils make up about 80 percent of the association, and minor soils the rest.

The surface layer of Dekalb soils is very dark gray and dark grayish-brown fine sandy loam to a depth of 5 inches and yellowish-brown fine sandy loam to a depth of 8 inches. All of this layer is stony or flaggy. The subsoil, to a depth of about 33 inches, is mainly fine sandy loam and sandy loam; it is yellowish brown in the upper part and reddish yellow in the lower part. Below this, to a depth of about 60 inches, is pinkish-white weathered sandstone. Hard sandstone is at a depth of 60 inches.

Minor in this association are the Masada, Talladega, and Tallapoosa soils. Masada soils are on the narrow bands and at the base of slopes in hollows. Talladega and Tallapoosa soils are slightly more clayey than the major Dekalb soils.

About 95 percent of this association is woodland, mostly mixed stands of hardwoods and pines. Virginia pine, shortleaf pine, and a few loblolly pine grow in naturally reforested areas. Cultivated areas are widely scattered and make up a small part of the association. Corn, grain sorghum, hay, and home gardens are grown chiefly for use on farms. Except in deep, fairly smooth areas in the valley, these soils are not suited to cultivated crops. The moderately shallow root zone, the stones, and the steep slopes make use of farm machinery almost impractical. Trees grow moderately well. This association could be developed for hunting, hiking, camping, and other recreational uses.

The major soils have severe limitations if used for homesites, highways, sewage lagoons, and other nonfarm purposes.

9. *Ashe-Edneyville-Tusquitee association*

Mainly steep, stony soils that have a yellowish-brown to dark yellowish-brown, loamy subsoil; on mountain ridgetops, in coves, and at the base of slopes

This association is in the northeastern part of Pickens County and on the eastern and northern ridge crest of Gilmer County, on mountains that rise abruptly from about 2,000 to about 4,000 feet. It is characterized by several mountain peaks, a mass of irregularly shaped mountains and high hills, and long, crooked drains that form deep, narrow hollows. The stony, shallow soils are on ridgetops and long side slopes, whereas the deep colluvial soils are at the base of slopes, in coves, and in draws. Slopes are mainly 25 to 80 percent; the colluvial soils are mostly 6 to 25 percent.

This association occupies about 12 percent of the survey area. It is about 70 percent Ashe and Edneyville soils, 20 percent Tusquitee soils, and 10 percent minor soils.

Ashe soils are on ridgetops and side slopes. Their surface layer is very dark grayish-brown to dark-brown stony loam about 8 inches thick. Their subsoil, about 12 inches thick, is dark yellowish-brown stony loam and is underlain by 4 inches of dark-brown sandy loam. Weathered gneiss and hard gneiss are at a depth of about 24 inches.

Edneyville soils have a surface layer of very dark grayish-brown loam, about 3 inches thick, that overlies about 4 inches of dark yellowish-brown loam. Their subsoil is about 23 inches of clay loam. It is dark yellowish brown in the upper part and yellowish brown in the lower part. Below this, to a depth of about 52 inches, is mostly weathered saprolite. Cobblestones and stony fragments are on the surface and generally throughout the solum.

Tusquitee soils are in narrow coves, on benches, and at the base of slopes. Their surface layer is dark-brown loam about 7 inches thick. Below this is dark yellowish-brown loam about 5 inches thick. Their subsoil is yellowish-brown clay loam and loam that extend to a depth of about 72 inches. Below the subsoil is yellowish-brown and pale-brown, weathered fragments of gneiss and schist.

Minor soils in this association are the Porters soils on high ridgetops and the Talladega and Tallapoosa soils in rocky areas.

Except for the gentle slopes of the Tusquitee soils, this association is not suited to farming. The shallow root zone, the stones, and the steep slopes make cultivation with farm machinery impractical. Trees grow moderately well. The smoothly sloping areas of Tusquitee soils are suited to row crops, truck crops, and pasture. This association could be developed for recreational uses, such as hunting, hiking, camping, and fishing.

These soils have severe limitations if used for residential or industrial sites because they are mostly steep and stony. Cutting, filling, smoothing for foundations, and other extensive site preparations are needed. Unless soils are compacted at optimum moisture content, fills are likely to slip.

10. *Hayesville-Madison association*

Mostly steep soils that have a yellowish-red and red clay and clay loam subsoil; on narrow ridgetops and irregular hillsides

This association consists of well-drained soils on narrow ridgetops and of steep soils on hillsides dissected by narrow, well-defined drainageways. It occurs in an area along the eastern boundary of Pickens and Cherokee Counties. Slopes generally range from 10 to 25 percent.

This association occupies about 2 percent of the survey area. It is about 50 percent Hayesville soils, 30 percent Madison soils, and 20 percent minor soils.

Hayesville soils have a surface layer of dark grayish-brown to dark-brown fine sandy loam about 6 inches thick. Their subsoil is yellowish-red to red clay loam or clay that extends to a depth of about 35 inches.

Madison soils have a surface layer of dark-brown fine sandy loam about 6 inches thick. The subsoil is red clay loam and sandy clay loam that extend to a depth of about 27 inches. Below is a 6-inch layer of red sandy clay loam underlain by reddish-brown saprolite high in mica content.

In counties east of the survey area, soils similar to Madison soils are correlated as Fannin soils. These soils differ mainly in average annual temperature.

Of the minor soils, the Tallapoosa soils, which are high in mica content, are on narrow ridges; the well-drained Grover soils are on uplands; the well-drained Starr soils are along the narrow drainageways; and the Toccoa, Chewacla, and Cartecay soils are on the narrow flood plains along small streams.

Some areas are eroded; most of the original surface layer has been washed away. These areas have been cultivated, but are now mostly in pine forest. About 90 percent of this association is woodland, mostly mixed stands of hardwoods and pines. Nearly 5 percent is used for pasture or hay crops. The rest, along draws and drainageways, is in garden crops, corn, and improved pasture. The association is mostly managed for forest by local farmers, but a small acreage is owned and managed by pulpwood companies.

The major soils have moderate to severe limitations if used for residences, sites for light industry, sewage lagoons, and similar uses. The soils can be developed for wildlife habitat.

Descriptions of the Soils

This section describes the soil series and the mapping units in Cherokee, Gilmer, and Pickens Counties. For complete information on any one mapping unit, it is necessary to read both the description of that unit and the description of the soil series to which it belongs.

Each soil series contains two descriptions of a soil profile. The first is brief and in terms familiar to a layman. The second, detailed and in technical terms, is for scientists, engineers, and others who need to make thorough and precise studies of soil. The colors are those of a moist soil unless otherwise stated.

As mentioned in the section "How This Survey Was Made," not all mapping units are members of a soil series. Rock land, for example, does not belong to a series but, nevertheless, is listed in alphabetic order along with the soil series.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit is the capability unit and woodland group in which the mapping unit has been placed. The page on which each capability unit is described can be found by referring to the "Guide to Mapping Units" at the back of this survey.

The acreage and proportionate extent of each mapping unit are shown in table 1. Many of the terms used in describing soils can be found in the Glossary at the end of this survey and in the "Soil Survey Manual" (*10*).[1]

[1] Italicized numbers in parentheses refer to Literature Cited, p. 71.

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Soil	Cherokee County		Gilmer County		Pickens County		Total	
	Acres	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*
Alluvial land, cobbly	0		1, 385	0. 5	0		1, 385	0. 2
Appling sandy loam, 2 to 6 percent slopes, eroded	965	0. 4	0		0		965	. 1
Appling sandy loam, 6 to 10 percent slopes, eroded	1, 130	. 4	0		0		1, 130	. 2
Appling sandy loam, 10 to 15 percent slopes, eroded	1, 125	. 4	0		0		1, 125	. 2
Ashe and Edneyville stony loams, 10 to 25 percent slopes	0		2, 575	. 9	1, 595	1. 1	4, 170	. 6
Ashe and Edneyville stony loams, 25 to 60 percent slopes	0		46, 940	16. 7	4, 235	3. 0	51, 175	7. 4
Ashe stony loam, 60 to 80 percent slopes	0		5, 795	2. 1	860	. 6	6, 655	1. 0
Augusta fine sandy loam	365	. 1	730	. 3	470	. 3	1, 565	. 2
Buncombe loamy sand	935	. 4	690	. 2	325	. 2	1, 950	. 3
Chewacla-Cartecay complex	10, 285	3. 9	8, 455	3. 0	4, 880	3. 4	23, 620	3. 4
Dekalb flaggy fine sandy loam, 6 to 15 percent slopes	2, 485	. 9	0		1, 590	1. 1	4, 075	. 6
Dekalb stony fine sandy loam, 15 to 25 percent slopes	2, 325	. 9	0		2, 435	1. 7	4, 760	. 7
Dekalb stony fine sandy loam, 25 to 60 percent slopes	10, 640	4. 0	0		3, 325	2. 3	13, 965	2. 0
Grover fine sandy loam, 2 to 6 percent slopes	580	. 2	710	. 3	1, 540	1. 1	2, 830	. 4
Grover fine sandy loam, 6 to 10 percent slopes, eroded	560	. 2	575	. 2	1, 040	. 7	2, 175	. 3
Grover fine sandy loam, 10 to 15 percent slopes	730	. 3	790	. 3	760	. 5	2, 280	. 3
Gwinnett loam, 2 to 6 percent slopes, eroded	1, 985	. 8	0		305	. 2	2, 290	. 3
Gwinnett loam, 6 to 10 percent slopes, eroded	1, 960	. 7	0		155	. 1	2, 115	. 3
Gwinnett loam, 10 to 25 percent slopes, eroded	3, 805	1. 5	0		385	. 3	4, 190	. 6
Gwinnett sandy clay loam, 2 to 6 percent slopes, eroded	1, 435	. 5	0		310	. 2	1, 745	. 3
Gwinnett sandy clay loam, 6 to 15 percent slopes, severely eroded	7, 895	3. 0	320	. 1	1, 095	. 8	9, 310	1. 3
Gwinnett sandy clay loam, 15 to 25 percent slopes, severely eroded	620	. 2	55	(1)	290	. 2	965	. 1
Hayesville fine sandy loam, 2 to 6 percent slopes	3, 535	1. 3	165	. 1	1, 345	. 9	5, 045	. 7
Hayesville fine sandy loam, 6 to 10 percent slopes	11, 040	4. 2	2, 405	. 9	2, 970	2. 1	16, 415	2. 4
Hayesville fine sandy loam, 10 to 25 percent slopes	20, 075	7. 6	8, 060	2. 9	4, 055	2. 8	32, 190	4. 7
Hayesville sandy clay loam, 2 to 10 percent slopes, severely eroded	9, 205	3. 5	275	. 1	1, 660	1. 2	11, 140	1. 6

See footnote at end of table.

TABLE 1.—*Approximate acreage and proportionate extent of the soils*—Continued

Soil	Cherokee County		Gilmer County		Pickens County		Total	
	Acres	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*
Hayesville sandy clay loam, 10 to 25 percent slopes, severely eroded	10, 090	3. 8	1, 120	0. 4	1, 545	1. 1	12, 755	1. 8
Helena sandy loam, 2 to 10 percent slopes	475	. 2	0	--------	0	--------	475	. 1
Hiwassee loam, 2 to 6 percent slopes	280	. 1	315	. 1	285	. 2	880	. 1
Hiwassee loam, 6 to 10 percent slopes	440	. 2	550	. 2	180	. 1	1, 170	. 2
Hiwassee clay loam, 6 to 15 percent slopes, severely eroded	965	. 4	775	. 3	740	. 5	2, 480	. 4
Madison gravelly sandy clay loam, 2 to 10 percent slopes, eroded	7, 210	2. 7	1, 215	. 4	1, 690	1. 2	10, 115	1. 5
Madison fine sandy loam, 2 to 6 percent slopes	1, 140	. 4	300	. 1	210	. 2	1, 650	. 2
Madison fine sandy loam, 6 to 10 percent slopes	7, 860	3. 0	1, 520	. 5	3, 685	2. 6	13, 065	1. 9
Madison fine sandy loam, 10 to 15 percent slopes	13, 825	5. 2	13, 630	4. 9	7, 525	5. 2	34, 980	5. 1
Masada gravelly loam, 2 to 10 percent slopes	835	. 3	1, 425	. 5	545	. 4	2, 805	. 4
Masada fine sandy loam, 0 to 2 percent slopes	310	. 1	160	. 1	105	. 1	575	. 1
Masada fine sandy loam, 2 to 6 percent slopes	1, 915	. 7	2, 015	. 7	1, 395	1. 0	5, 325	. 8
Masada fine sandy loam, 6 to 10 percent slopes, eroded	605	. 2	570	. 2	565	. 4	1, 740	. 3
Masada sandy clay loam, 10 to 15 percent slopes, eroded	400	. 2	915	. 3	475	. 3	1, 790	. 3
Musella cobbly loam, 10 to 25 percent slopes	2, 940	1. 1	885	. 3	865	. 6	4, 690	. 7
Porters loam, 6 to 15 percent slopes	0	--------	1, 530	. 5	990	. 7	2, 520	. 4
Rock land	155	. 1	120	(1)	245	. 2	520	. 1
Starr fine sandy loam	1, 045	. 4	1, 805	. 6	1, 170	. 8	4, 020	. 6
Talladega flaggy loam, 60 to 80 percent slopes	2, 050	. 8	2, 440	. 9	1, 190	. 8	5, 680	. 8
Talladega channery loam, 10 to 25 percent slopes	5, 065	1. 9	6, 575	2. 3	3, 925	2. 7	15, 565	2. 3
Talladega channery loam, 25 to 60 percent slopes	5, 610	2. 1	13, 195	4. 7	8, 025	5. 6	26, 830	3. 9
Tallapoosa cobbly sandy loam, 10 to 25 percent slopes	2, 345	. 9	1, 700	. 6	1, 190	. 8	5, 235	. 8
Tallapoosa cobbly sandy loam, 25 to 60 percent slopes	20, 995	7. 9	64, 030	22. 8	24, 190	16. 8	109, 215	15. 8
Tallapoosa channery sandy loam, 25 to 60 percent slopes	11, 115	4. 2	6, 845	2. 4	8, 490	5. 9	26, 450	3. 8
Tallapoosa fine sandy loam, 6 to 15 percent slopes	4, 835	1. 8	2, 105	. 7	2, 705	1. 9	9, 645	1. 4
Tallapoosa fine sandy loam, 15 to 25 percent slopes	25, 365	9. 6	30, 045	10. 7	17, 915	12. 4	73, 325	10. 6
Tallapoosa gravelly sandy clay loam, 10 to 25 percent slopes, eroded	19, 450	7. 3	8, 575	3. 1	8, 080	5. 6	36, 105	5. 2
Toccoa complex	5, 550	2. 1	3, 820	1. 4	2, 205	1. 5	11, 575	1. 7
Tusquitee stony loam, 10 to 25 percent slopes	0	--------	4, 445	1. 6	0	--------	4, 445	. 6
Tusquitee loam, 2 to 6 percent slopes	840	. 3	1, 540	. 5	930	. 6	3, 310	. 5
Tusquitee loam, 6 to 10 percent slopes	260	. 1	1, 100	. 4	500	. 3	1, 860	. 3
Tusquitee loam, 10 to 25 percent slopes	565	. 2	9, 395	3. 3	1, 595	1. 1	11, 555	1. 7
Wehadkee loam	1, 995	. 8	1, 755	. 6	605	. 4	4, 355	. 6
Wickham fine sandy loam, 2 to 6 percent slopes	1, 380	. 5	725	. 3	325	. 2	2, 430	. 3
Wickham fine sandy loam, 6 to 10 percent slopes, eroded	1, 385	. 5	1, 725	. 6	675	. 5	3, 785	. 5
Wickham fine sandy loam, 10 to 25 percent slopes, eroded	1, 590	. 6	6, 405	2. 3	1, 355	. 9	9, 350	1. 4
Wickham sandy clay loam, 2 to 10 percent slopes, severely eroded	455	. 2	735	. 3	470	. 3	1, 660	. 2
Wickham sandy clay loam, 10 to 25 percent slopes, severely eroded	575	. 2	495	. 2	670	. 5	1, 740	. 3
Wilkes complex, 5 to 15 percent slopes	1, 315	. 5	0	--------	0	--------	1, 315	. 2
Worsham fine sandy loam	325	. 1	480	. 2	235	. 2	1, 040	. 1
Water	7, 725	2. 9	4, 055	1. 4	885	. 6	12, 665	1. 8
Total	264, 960	100. 0	280, 960	100. 0	144, 000	100. 0	689, 920	100. 0

[1] Less than 0.05 percent.

Descriptions, names, and delineations of soils in this soil survey do not fully agree with those of the soil maps in nearby counties published at different dates. Differences are the result of better knowledge of soils, modifications in series concepts, intensity of mapping, and the extent of soils in the survey area. In some places it is more feasible to combine small acreages of similar soils that respond in much the same way to use and management than it is to separate them.

Alluvial Land, Cobbly

Alluvial land, cobbly (Ajc) is well-drained and somewhat poorly drained alluvial and colluvial material on stream flood plains. It is gravelly and cobbly and varies from place to place but is mainly brown or dark grayish-brown, coarse-textured loam, fine sandy loam, and silt loam. In places at a depth of 10 to 24 inches, it is about 90 percent pebbles or cobblestones. Floods occur occasionally. Slopes are 0 to about 3 percent. Included in the mapping are areas of Toccoa, Chewacla, and Cartecay soils.

The organic-matter content is low. The available water capacity and permeability vary. Tilth is generally poor because of coarse fragments in the surface layer.

This land is fairly well suited to clover, fescue, lespedeza, corn, beans, sorghum, and similar locally grown crops. It also is a good source of roadbuilding material. Most of the acreage is pastured or cultivated. (Capability unit IIIw-2; woodland group 2w8)

Appling Series

The Appling series consists of well-drained soils that formed on uplands, in material weathered from gneiss, schist, and granite. These soils are mostly on fairly broad ridgetops and to a lesser extent on short hillsides. Slopes range from 2 to 15 percent.

Typically, the surface layer is dark grayish-brown sandy loam about 6 inches thick. The subsoil is reddish yellow to yellowish brown mottled with brownish yellow, strong brown, and yellowish red and extends to a depth of about 50 inches. It is sandy clay loam in the uppermost 4 inches, sandy clay and clay in the next 34 inches, and sandy clay loam in the lowermost 6 inches. Below this, to a depth of about 56 inches is red, yellow, and brown saprolite.

These soils are low in natural fertility and organic-matter content and are slightly acid to very strongly acid. Permeability is moderate, and the available water capacity is medium. Tilth is generally good, and the root zone is deep.

Appling soils are well suited to farming. Most of the acreage on the smoother slopes is cultivated or pastured. On the steeper soils, the chief vegetation is generally oak, hickory, yellow-poplar, sweetgum, shortleaf pine, and loblolly pine.

Representative profile of Appling sandy loam, 2 to 6 percent slopes, eroded:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) sandy loam; weak, fine, granular structure; very friable; many fine roots; slightly acid; abrupt, smooth boundary.

B1—6 to 10 inches, reddish-yellow (5YR 7/6) sandy clay loam; few, fine, distinct brownish-yellow mottles; weak, medium, subangular blocky structure; friable; many fine roots; strongly acid; clear, smooth boundary.

B21t—10 to 30 inches, yellowish-brown (10YR 5/8) sandy clay to clay; many, medium, faint, strong-brown (7.5YR 5/8) mottles; moderate, medium, subangular blocky structure; friable; clay films on ped surfaces; very strongly acid; gradual, wavy boundary.

B22t—30 to 44 inches, reddish-yellow (5YR 6/8) clay; many, medium, distinct brownish-yellow (10YR 6/8) and yellowish-red (5YR 5/8) mottles; moderate, medium, subangular blocky structure; friable to firm; few fine mica flakes; clay films on ped surfaces; very strongly acid; gradual, wavy boundary.

B3t—44 to 50 inches, reddish-yellow (5YR 6/8) sandy clay loam; few, fine, distinct brownish-yellow mottles; weak, medium, subangular blocky structure; very friable; common fine mica flakes; very strongly acid; gradual, wavy boundary.

C—50 to 56 inches +, mottled red, yellow, and brown weathered mica-gneiss and schist saprolite; massive; very friable; very strongly acid.

The Ap horizon is mostly sandy loam but is fine sandy loam to loam in some areas. It generally ranges from dark grayish brown to light yellowish brown but is very dark grayish brown in a few wooded areas. The B2t horizon ranges from sandy clay to clay. It is yellowish brown, strong brown, or yellowish red mottled with brown, yellow, and red. Fine mica flakes are few to common in the B22t and B3t horizons and increase in number in the C horizon. Cobblestones and pebbles range from none to common; they occur on the surface and throughout the solum. The solum averages about 48 inches in thickness but ranges from 40 to 56 inches. This soil is underlain by soft weathered saprolite at a depth of about 4 or 5 feet. Hard rock is ordinarily deeper than 8 feet.

Appling soils occur mainly with Hayesville, Tallapoosa, and Madison soils. They are not so red as Hayesville and Madison soils, and they are deeper than those soils. They contain fewer mica flakes than Madison soils. They are not so micaceous as Tallapoosa soils, and they lack the thin Bt horizon that is typical of those soils.

Appling sandy loam, 2 to 6 percent slopes, eroded (AmB2).—This soil is on fairly broad ridgetops, in areas of about 10 to 20 acres. It has the profile described as representative for the series. There are a few shallow washes and rills and, in old roadways and trails, a few gullies 3 to 5 feet deep. Included in mapping are small areas of Hayesville or Madison soils.

This Appling soil is suited to most locally grown crops. The response to management is good, especially to lime and fertilizer. Tilth is good, except in the more eroded areas. The erosion hazard is slight to moderate in cultivated fields. Most of the acreage is in crops and pasture. (Capability unit IIe-2; woodland group 3o7)

Appling sandy loam, 6 to 10 percent slopes, eroded (AmC2).—This soil is commonly on ridgetops and hillsides between drainageways, in areas of about 10 to 20 acres. Its profile is similar to the one described as representative for the series. The combined thickness of the surface layer and the subsoil is about 46 inches. There are a few shallow gullies and a few 3 to 5 feet deep in old roadways, trails, and pathways. Included in mapping are small areas of Hayesville and Madison soils, a few areas where there is little or no erosion, and a few severely eroded areas.

This Appling soil is suited to a wide range of locally grown crops. In cultivated areas, surface runoff is medium and the erosion hazard is moderate to severe. Except in the severely eroded areas, tilth is good. About half the acreage is cultivated and pastured; the rest is wooded. (Capability unit IIIe-2; woodland group 3o7)

Appling sandy loam, 10 to 15 percent slopes, eroded (AmD2).—This soil is on hillsides adjacent to drainageways. The surface layer is sandy loam 4 to 7 inches thick. It overlies a yellowish-red clay or sandy clay subsoil that is mottled with red and strong brown. The subsoil extends to a depth of about 40 inches. There are a few shallow gullies and in places a few deep gullies. Included in the mapping are areas of Hayesville, Madison, and Tallapoosa soils, a few wooded areas that are slightly eroded, and some areas that are severely eroded.

This Appling soil is too steep to be well suited to cultivated crops. It is better suited to permanent pasture and woodland. Most of the acreage has been cultivated but is now wooded. Only a small acreage is pastured. (Capability unit IVe–1; woodland group 3o7)

Ashe Series

The Ashe series consists of somewhat excessively drained, moderately steep to very steep, stony soils on the ridgetops of foothills. These soils formed in material weathered from gneiss, granite, and schist. Elevations of 2,000 and 3,000 feet are common. Slopes range from 10 to 80 percent.

Typically, the surface layer is very dark grayish-brown loam in the upper 5 inches and dark-brown loam in the lower 3 inches. The subsoil is dark yellowish-brown loam or clay loam about 12 inches thick. Both the surface layer and the subsoil are stony. Below the subsoil is 4 inches of dark-brown sandy loam. At a depth of about 24 inches is weathered gneiss and hard gneiss (fig. 2).

Ashe soils are moderate to low in natural fertility and organic-matter content and are strongly acid. Permeability is moderately rapid, and the available water capacity is low. In most places the root zone is shallow.

These soils are not suitable for cultivation. Most of the acreage is woodland. Many areas have an undergrowth of rhododendron, mountain-laurel, and wild azalea. A few small areas have been cleared for gardens and pastures. The native vegetation is chiefly oak, yellow-poplar, hickory, maple, sourwood, white pine, and Virginia pine.

Representative profile of Ashe stony loam, 25 to 60 percent slopes:

O1—1 inch to 0, partly decomposed leaves, twigs, and forest litter.

A1—0 to 5 inches, very dark grayish-brown (10YR 3/2) loam; weak, fine, granular structure; very friable; many fine and medium roots; few fine mica flakes; about 20 to 35 percent cobblestones and stones; strongly acid; clear, smooth boundary.

A3—5 to 8 inches, dark-brown (10YR 4/3) loam; weak, fine, granular structure; very friable; many fine and medium roots; few very fine mica flakes; about 20 to 35 percent cobblestones and stone fragments; strongly acid; clear, smooth boundary.

B—8 to 20 inches, dark yellowish-brown (10YR 4/4) loam or clay loam; weak, fine, subangular blocky structure; few fine roots; few small mica flakes; about 20 percent cobblestones and stones in parts; strongly acid; gradual, wavy boundary.

C—20 to 24 inches, dark-brown (10YR 4/3) sandy loam; massive; very friable; strongly acid; gradual, irregular boundary.

R—24 to 30 inches +, yellowish-brown (10YR 5/4) weathered gneiss and hard gneiss rock.

Figure 2.—**Profile of Ashe stony loam, 60 to 80 percent slopes.**

The A horizon is mostly loam and sandy loam. It ranges from very dark grayish brown and dark brown to dark yellowish brown in color and from 6 to 14 inches in thickness. The B horizon is dark yellowish-brown, yellowish-brown, or strong-brown loam, sandy loam, or clay loam. The solum ranges from 18 to 30 inches in thickness. There are stones or boulders of weathered gneiss throughout most layers of the profile and few to many pebbles, cobblestones, and stones on the surface. Hard folded gneiss and schist are at a depth of 2 to 5 feet. In some places they are horizontally bedded, but in other places they are vertically oriented.

Ashe soils occur with Edneyville, Porters, and Tusquitee soils. They are similar to Edneyville soils in color but are more sandy in the B horizon. They lack the thick dark-colored A horizon that is typical of Porters soils and have a less clayey B horizon than those soils. They have a less clayey B horizon than Tusquitee soils, which commonly occur at lower elevations in colluvial draws.

Ashe and Edneyville stony loams, 10 to 25 percent slopes (AEE).—These soils occur on ridges and saddles of the higher mountains. Areas are 50 to 100 acres in size. The profiles of the two soils are similar to those described as representative for their respective series. The texture of the surface layer ranges from loam through sandy loam. These soils occur in an irregular pattern; one or both may occur in each mapped area. Included in the mapping are small areas of Porters soils and areas of a similar soil that has a black surface layer high in organic-matter content.

These soils are ordinarily too steep and stony for farming. Most of the acreage is woodland of hardwood and scattered pine. (Capability unit VIIs–1; woodland group 3x2)

Ashe and Edneyville stony loams, 25 to 60 percent slopes (AEF).—These soils occur in fairly large areas on narrow ridgetops and on long irregular, mountainous side slopes. Their profiles are those described as representative for the respective series. The surface layer is stony loam to sandy loam. Included in the mapping are areas of a similar soil that has a black surface layer high in organic-matter content.

These soils are too stony and too steep for farming, but they are well suited to woodland. All the acreage is woodland, mostly hardwoods and scattered pines. (Capability unit VIIs–1; woodland group 3x3)

Ashe stony loam, 60 to 80 percent slopes (AcG).—This soil occurs on mountains and escarpments at about the highest elevations in the survey area. Areas are 25 to about 50 acres in size. The surface layer is dark-brown loam. The subsoil is strong-brown or dark yellowish-brown loam about 15 inches thick. The surface layer and the subsoil contain stones and cobblestones. Included in the mapping are areas of a similar soil in which the combined thickness of the surface layer and the subsoil is about 12 inches. Also included are rock outcrops.

This Ashe soil produces good cover for woodland wildlife. The native vegetation consists of hardwood and white pine and an undergrowth of rhododendron, mountain-laurel, and wild azalea. Harvesting wood crops is a problem on the very steep slopes. (Capability unit VIIs-1; woodland group 3x3)

Augusta Series

The Augusta series consists of nearly level, somewhat poorly drained soils that formed in old alluvium deposits. These soils are mainly on low terraces along the major streams throughout Cherokee, Gilmer, and Pickens Counties.

Typically, the surface layer is dark grayish-brown fine sandy loam about 8 inches thick. The upper part of the subsoil is mottled yellowish-brown and light brownish-gray sandy clay loam and clay loam to a depth of about 26 inches. The lower part, to a depth of about 48 inches, is gray loam.

These soils are low in organic-matter content and natural fertility and are strongly acid to very strongly acid. The available water capacity is medium, and permeability is moderate. The water table is near the surface, especially during winter and spring. The plow layer has good tilth.

Augusta soils are suited to farming, although flooding and wetness are hazards. The acreage is mostly pastured, but some of it is cultivated or wooded.

Representative profile of Augusta fine sandy loam:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, fine, granular structure; very friable; many fine mica flakes and fine roots; strongly acid; clear, smooth boundary.

B21tg—8 to 16 inches, mottled yellowish-brown (10YR 5/8) and light brownish-gray (2.5Y 6/2) sandy clay loam; weak, medium, subangular blocky structure; friable; sand grains coated and bridged; many fine mica flakes; few fine roots; strongly acid; gradual, wavy boundary.

B22tg—16 to 26 inches, mottled yellowish-brown (10YR 5/8) and light brownish-gray (2.5Y 6/2) clay loam; moderate, medium, subangular blocky structure; firm; mottles are many, medium, distinct; sand grains coated and bridged; clay films on ped surfaces; many fine mica flakes; very strongly acid; gradual, wavy boundary.

B3g—26 to 48 inches +, gray (5Y 6/1) loam; common, fine, distinct mottles of reddish yellow; massive to weak, medium, subangular blocky structure; slightly sticky; many fine mica flakes; few pebbles; very strongly acid.

The Ap horizon ranges from dark grayish-brown to light olive-brown fine sandy loam. The B2tg horizon ranges from sandy clay loam to clay loam and is mottled with yellowish-brown, pale yellow, or light brownish-gray. The B3g horizon ranges from gray to light gray and is mottled with reddish-yellow. It is mostly loam but contains few to many pebbles and mica flakes. Thickness of the solum ranges from about 40 to 56 inches.

Augusta soils occur mainly with Chewacla, Cartecay, Wehadkee, and Worsham soils. They are on low stream terraces and have better developed horizons than Chewacla and Cartecay soils, which formed in recent alluvial sediments. They are better drained than Wehadkee and Worsham soils, which generally are at the lower elevations.

Augusta fine sandy loam (Afs).—This somewhat poorly drained soil occurs as areas of about 10 to 25 acres. It has the profile described as representative for the series. Slopes are 0 to about 2 percent. Included in mapping near streams are small areas of coarse-textured, sandy overwash 5 to 12 inches thick and small areas of Masada and Worsham soils.

The seasonal high water table influences the depth to which roots normally grow, and therefore, limits the range of suitable crops. Surface runoff is slow. Flooding is a hazard. Drainage is needed to remove excess surface water and improve internal drainage. Most areas are used for pasture, for which the soil is well suited. Corn is grown in some areas. (Capability unit IIIw-3; woodland group 2w8)

Buncombe Series

The Buncombe series consists of nearly level, excessively drained, sandy soils. These soils formed in alluvium on first bottoms. They occur as long, narrow areas, generally adjacent to rivers and other large streams.

Typically, the surface layer is dark-brown loamy sand about 12 inches thick. The next layer is loamy sand to a depth of 56 inches. The upper part of this layer is dark yellowish brown, and the middle and lower parts are yellowish-brown (fig. 3).

These soils are low in organic-matter content and natural fertility. They are very strongly acid. Permeability is rapid, and the available water capacity is low. The surface layer is in good tilth, and the root zone is deep. Droughtiness is not a limitation.

Buncombe soils are suited to only a few cultivated crops because of droughtiness. Most of the acreage is used for pasture or forest. The chief trees are yellow-poplar, sycamore, sweetgum, and loblolly pine.

Representative profile of Buncombe loamy sand:

Ap—0 to 12 inches, dark-brown (10YR 4/3) loamy sand; weak, fine, granular structure; very friable; many fine roots; common fine mica flakes; very strongly acid; abrupt, smooth boundary.

C1—12 to 14 inches, dark yellowish-brown (10YR 4/4) loamy sand; weak, fine, granular structure; loose to very friable; few fine roots and common fine mica flakes; very strongly acid; clear, wavy boundary.

C2—14 to 44 inches, yellowish-brown (10YR 5/6) loamy sand; weak, fine, granular structure to single grain; loose to

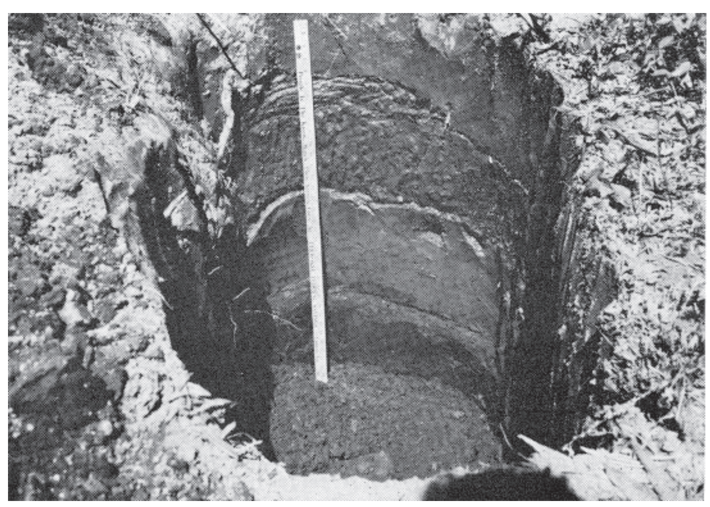

Figure 3.—**Profile of Buncombe loamy sand showing layers of recent sediment.**

very friable; common fine mica flakes; very strongly acid; gradual, wavy boundary.

C3—44 to 56 inches +, yellowish-brown (10YR 5/6) loamy sand; faint splotches of pale brown (10YR 6/3); single grain; very friable; common fine mica flakes; very strongly acid.

The A horizon is generally loamy sand but ranges to loamy fine sand and sand in some areas. It is yellowish brown, dark brown, or olive brown. The C horizon ranges from loamy sand to sand and is dark yellowish brown, dark grayish brown, or light olive brown. Pebbles range from none to many in some areas. The combined thickness of the A and C horizon ranges from 4 to 6 feet or more.

Buncombe soils occur mainly with Toccoa, Chewacla, Cartecay, and Wehadkee soils. They are similar to Toccoa soils in color but are coarser textured throughout the profile. They are better drained than Chewacla, Cartecay, and Wehadkee soils and are sandier throughout.

Buncombe loamy sand (Bfs).—This droughty soil is on flood plains, in areas of about 5 to 25 acres. It has the profile described as representative for the series. This soil is flooded occasionally for short periods. Slopes are 0 to about 2 percent. Included in mapping are small areas of Toccoa soils, areas of a similar soil that has a 6- to 12-inch layer of very dark grayish-brown sandy clay loam below the surface layer, and spots of sand drifts that make up about 6 percent of the acreage.

This Buncombe soil is fairly well suited to a few deep-rooted crops and grasses. The rapid permeability and sandy texture allow plant nutrients to leach rapidly. Most of the acreage is pastured or wooded; a small part is cultivated. (Capability unit IIIs-1; woodland group 2s8)

Cartecay Series

The Cartecay series consists of moderately well drained to somewhat poorly drained, loamy soils. These soils are on flood plains in long, narrow, winding valleys and along the major streams and rivers. They formed in alluvial sediments washed from adjacent hillsides. Slopes are 0 to 2 percent.

Typically, the surface layer is dark-brown loam about 9 inches thick. Below this is yellowish-brown loam that is mottled with dark brown and is about 9 inches thick. It is underlain by about 22 inches of pale-brown sandy loam mottled with yellowish brown and light gray. Below this, to a depth of about 54 inches, is gray, stratified sand and loamy sand.

These soils are low in natural fertility and organic-matter content and are medium acid. Permeability is moderately rapid, tilth is good, and the available water capacity is medium. The water table is within a depth of 20 inches during winter and spring. Floods occur at frequent, irregular intervals.

Most of the acreage is used for pasture, hay crops, or forest. Some areas are in corn or grain sorghum. The chief trees are sweetgum, yellow-poplar, water oak, alder, willow, ash, and loblolly pine.

The Cartecay soils in Cherokee, Gilmer, and Pickens Counties are mapped with Chewacla soils.

Representative profile of a Cartecay loam:

Ap—0 to 9 inches, dark-brown (10YR 4/3) loam; weak, fine, granular structure; very friable; many fine roots; many very fine mica flakes; medium acid; abrupt, smooth boundary.

C1—9 to 18 inches, yellowish-brown (10YR 5/4) loam mottled with dark brown (10YR 3/3); mottles are common, medium, and distinct; massive in place breaking to weak, medium, subangular blocky structure; thin bedding planes; very friable; many fine roots and mica flakes; medium acid; clear, smooth boundary.

C2—18 to 40 inches, pale-brown (10YR 6/3) sandy loam mottled with yellowish brown (10YR 5/4) and light gray (10YR 7/2); mottles are common, medium, and distinct; massive; thin horizontal bedding planes; very friable; many fine mica flakes; medium acid; gradual, wavy boundary.

C3g—40 to 54 inches +, gray (10YR 5/1) stratified sand and loamy sand; single grain; very friable; few and medium, rounded pebbles and gravel; many fine mica flakes; medium acid.

The A horizon ranges from dark brown and dark grayish brown to reddish brown. It is loam, fine sandy loam, sandy loam, or coarse sandy loam. The C horizon ranges from yellowish brown to light yellowish brown and has gray mottles within a depth of 20 inches. Its texture is sandy loam, fine sandy loam, loam, or loamy sand. The clay content between depths of 10 and 40 inches is less than 18 percent. Mica flakes range from common to many and are very fine to medium in size. The thickness of the soil material ranges from 3½ to 6 feet or more. The depth to hard rock is 10 feet or more. There are few to many pebbles in some profiles, especially in the lower part.

Cartecay soils occur mainly with Chewacla, Toccoa, Buncombe, and Wehadkee soils. They are similar to Chewacla soils in drainage and color but are less clayey between depths of 10 and 40 inches. They are less sandy throughout the solum than Buncombe soils and are wetter than Toccoa soils. They are better drained and less gray than Wehadkee soils.

Chewacla Series

The Chewacla series consists of nearly level, somewhat poorly drained soils that formed in sediments washed from soils on uplands. These soils are on long, narrow flood plains along the major creeks and rivers.

Typically, the surface layer is dark grayish-brown loam about 8 inches thick. The subsoil is clay loam and loam about 26 inches thick. It is olive-brown loam in the upper part and light olive-brown loam mottled with brownish gray and brownish yellow in the lower part. Below this, to a depth of about 48 inches, is olive-gray sandy loam.

These soils are flooded at frequent intervals, mostly during winter and spring. They are moderately high in natural fertility, moderately low in organic-matter content, and strongly acid or medium acid. Permeability is moderate. The available water capacity is medium to high. Tilth is good except in wet areas.

Chewacla soils are well suited to hay crops, pasture grasses, and trees. Most of the acreage is used for pasture or hardwood forest. A few areas are in corn or grain sorghum. The native vegetation is mostly oak, yellow-poplar, elm, willow, beech, sweetgum, alder, ash, and pine.

Representative profile of a Chewacla loam:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) loam; weak, medium, granular structure; very friable; many fine roots, few fine mica flakes; strongly acid; clear, wavy boundary.

B21—8 to 14 inches, olive-brown (2.5Y 4/4) clay loam; weak, medium, subangular blocky structure; friable; many fine roots; few fine mica flakes; strongly acid; gradual, wavy boundary.

B22—14 to 34 inches, light olive-brown (2.5Y 5/4) loam; streaks of brownish yellow (10YR 6/8); common, fine and distinct, light brownish-gray mottles; the amount increases with depth; weak, medium, subangular blocky structure; friable; few roots; few fine mica flakes; strongly acid; gradual, wavy boundary.

Cg—34 to 48 inches +, olive-gray (5Y 4/2) sandy loam; massive; slightly sticky; strongly acid; seasonal high water table.

The A horizon ranges from dark grayish brown and brown to dark brown in color and from silt loam to fine sandy loam in texture. The B horizon ranges from loam to silty clay loam. The B21 horizon is olive brown or yellowish brown. The B22 horizon is light olive brown and light yellowish brown mottled with light brownish gray. Reaction is strongly acid to medium acid. Fine mica flakes range from few to many throughout the solum. The thickness of the soil material ranges from 3½ to 6 feet or more. Depth to hard rock is 10 feet or more.

Chewacla soils occur chiefly with Cartecay, Toccoa, Buncombe, Wehadkee, and Augusta soils. They are similar in color and drainage to Cartecay soils but are more clayey and are more strongly acid between a depth of 10 and 40 inches. They are wetter and less sandy throughout than Toccoa and Buncombe soils and are not so poorly drained as Wehadkee soils. Their B horizon is not so well developed as that of Augusta soils.

Chewacla-Cartecay complex (Chc).—This complex is about 40 percent Chewacla soils and 40 percent Cartecay soils. These soils are somewhat poorly drained to moderately well drained and medium acid to strongly acid. They occur as long, narrow strips adjacent to major creeks and rivers (fig. 4), in areas of about 5 to 25 acres. Included in the mapping were sandy soils similar to Cartecay soils.

Runoff is slow. Permeability is moderate to moderately rapid. The available water capacity is medium in most areas but is high in places.

These soils are well suited to pasture plants and trees, but they are not well suited to cultivated crops because of flooding and wetness. They are used for pasture and for woodland, mostly hardwoods. (Capability unit IIIw–2; woodland group 2w8)

Dekalb Series

The Dekalb series consists of well-drained soils that developed in residuum weathered from thick bedded sandstone and quartzite. These soils are on mountain ridgetops and side slopes. Fragments of shale, slate, and schist are scattered on the surface. Slopes range from 6 to 60 percent.

Typically, the surface layer is very dark gray and dark grayish-brown fine sandy loam in the upper 5 inches and yellowish-brown fine sandy loam in the lower 3 inches. All of this layer is stony. The subsoil is mainly fine sandy loam and sandy loam to a depth of about 33 inches. It is yellowish brown in the upper part and reddish yellow in the lower part. Below this is pinkish-white weathered sandstone. Hard sandstone is at a depth of 60 inches.

These soils are low in natural fertility and content of organic matter and are very strongly acid. Available water capacity is low to medium. Permeability is rapid. In most areas tilth is poor.

Most of the acreage is woodland, for which these soils are suited. Small acreages on the smoother slopes are culti-

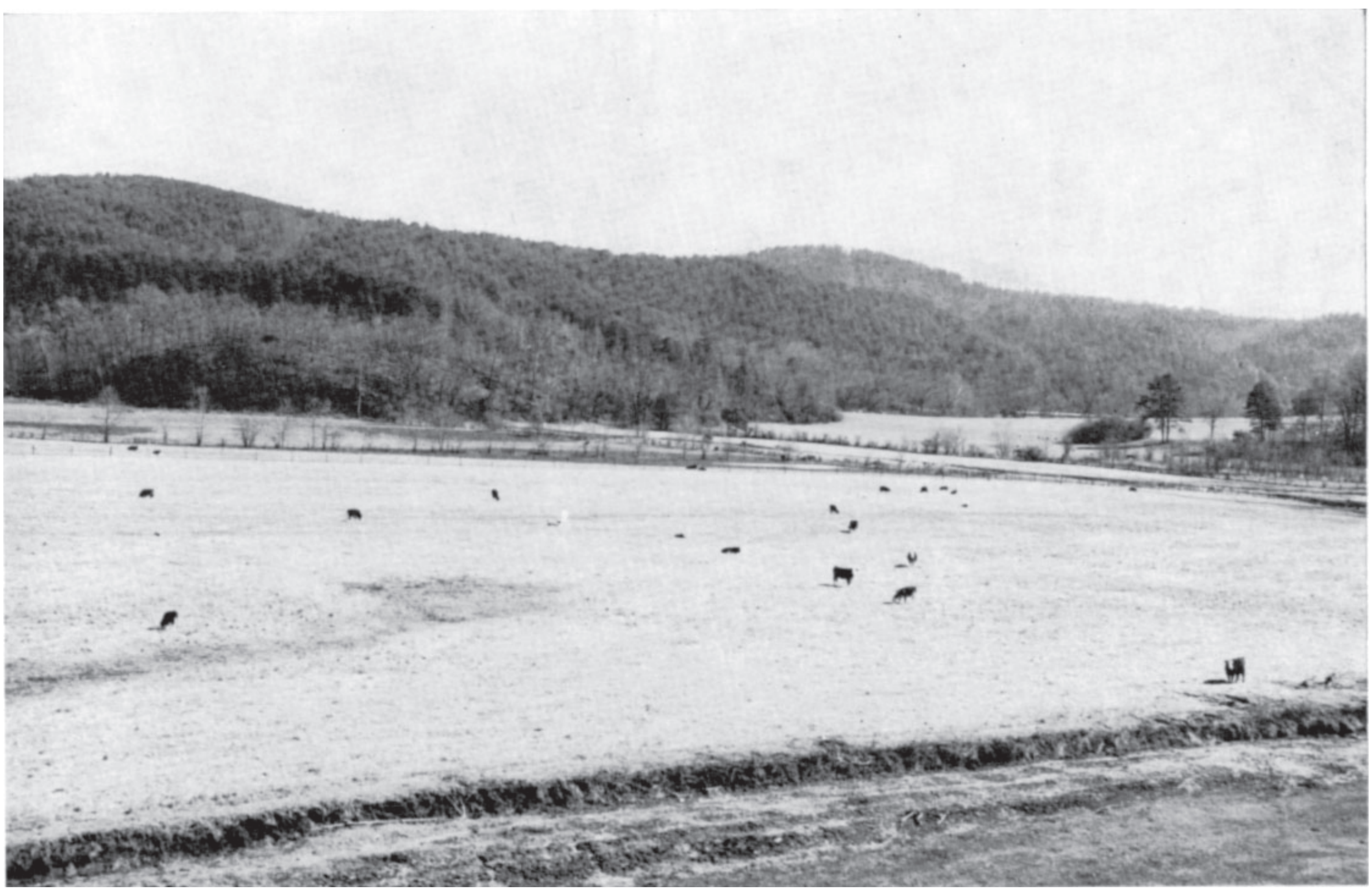

Figure 4.—**A typical pasture on bottom land in the Chewacla-Cartecay complex.**

vated or pastured. Numerous rock fragments are a hazard in cultivated areas.

Representative profile of Dekalb stony fine sandy loam, 25 to 60 percent slopes:

A11—0 to 2 inches, very dark gray (10YR 3/1) fine sandy loam; weak, fine, granular structure; very friable to loose; many fine roots; about 40 percent of surface covered with large sandstone fragments; very strongly acid; abrupt, smooth boundary.

A12—2 to 5 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; about 40 percent cobblestones and large stones; very strongly acid; clear, wavy boundary.

A3—5 to 8 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; about 50 percent cobblestones and large stones; very strongly acid; clear, wavy boundary.

B2—8 to 27 inches, yellowish-brown (10YR 5/8) fine sandy loam; moderate, medium, subangular blocky structure; friable; few clay films on ped surfaces; few fine roots; very strongly acid; gradual, wavy boundary.

B3—27 to 33 inches, reddish-yellow (5YR 6/6) sandy loam; massive; very friable to loose; thin lenses of soft weathered sandstone and schist; few fine roots; very strongly acid; abrupt, irregular boundary.

C—33 to 60 inches, pinkish-white (5YR 8/2) weathered sandstone; crushes to a loamy fine sand; massive; soft; very strongly acid; abrupt, wavy boundary.

R—60 inches +, hard sandstone bedrock.

The A horizon ranges from fine sandy loam to loam and is flaggy or stony. The A11 horizon is mostly very dark gray to very dark grayish brown, but the A12 horizon ranges from dark grayish brown to grayish brown. The B2 horizon is yellowish brown, strong brown, or reddish yellow and is mostly fine sandy loam. Sandstone gravel, flaggy cobblestones, and stones on the surface and throughout most of the solum range from common to many. The depth to hard bedrock ranges from 2 to 5 feet.

Dekalb soils occur mainly with Talledega, Tallapoosa, and Madison soils. They resemble Tallapoosa soils but are deeper than those soils and are not micaceous. Their B horizon is browner than that of Talladega and Madison soils and is not so clayey.

Dekalb flaggy fine sandy loam, 6 to 15 percent slopes (DfD).—This flaggy soil occurs on fairly smooth, broad ridgetops and sloping hillsides. Its profile is similar to that described as representative for the series, but the rock fragments on the surface and in the surface layer and the subsoil are platy; they are also smaller and make up less of the soil mass than is typical. Included in mapping are a few eroded areas that have been cultivated and areas

Figure 5.—**Dekalb stony fine sandy loam, 25 to 60 percent slopes, on mountain side slopes.**

where the slope is less than 6 percent and the subsoil is 6 to 10 inches thick.

This Dekalb soil is subject to erosion, is flaggy, is low in fertility, and is not well suited to cultivated crops. It is better suited to pasture, perennial vegetation, or woodland. (Capability unit VIe–3; woodland group 3x2)

Dekalb stony fine sandy loam, 15 to 25 percent slopes (DuE).—This soil occurs on broad mountain ridgetops and long side slopes, in areas of about 25 to 50 acres. It contains fewer large stones and boulders than the soil described as representative of the Dekalb series. Included in mapping are small areas of rock outcrops and areas of Tallapoosa and Talladega soils.

Because of stoniness, steep slope, and low fertility, this soil is better suited to permanent native vegetation than to other uses. Most of the acreage is in native vegetation of mixed hardwoods and scattered pines. (Capability unit VIIe–3; woodland group 3x2)

Dekalb stony fine sandy loam, 25 to 60 percent slopes (DuF).—This soil generally occurs as areas of up to 50 acres or more on long mountain side slopes (fig. 5). It has the profile described as representative for the Dekalb series. Included in mapping are areas of Talladega and Tallapoosa soils and small areas of rock outcrop.

All the acreage is woodland, for which the soil is suited. Harvesting wood products is difficult without special logging equipment because of the steep slopes and the stoniness. (Capability unit VIIe–3; woodland group 3x3)

Edneyville Series

The Edneyville series consists of well-drained, stony soils that formed in material weathered from gneiss, granite, and schist. These soils are on ridgetops and mountain foot hills where elevations are about 2,000 and 3,000 feet. Slopes range from 10 to 60 percent.

Typically, the surface layer is very dark grayish-brown loam about 3 inches thick. The next layer, about 4 inches thick, is dark yellowish-brown loam. The subsoil is clay loam, about 23 inches thick, that is dark yellowish brown in the upper part and yellowish brown in the lower part. Below the subsoil is mostly weathered saprolite to a depth of about 52 inches. Stone fragments and cobblestones are on the surface and throughout the surface layer and the subsoil.

These soils are moderate in natural fertility and content of organic matter and are strongly acid to very strongly acid. Permeability is moderate, and the available water capacity is medium. The root zone is moderately deep.

These soils are not suitable for cultivation or pasture. Most of the acreage is wooded. The native vegetation is mainly deciduous forest of oak, hickory, yellow-poplar, and maple but includes a few white pines and Virginia pines and an undergrowth of rhododendron, mountain-laurel, wild azalea, and dogwood.

The Edneyville soils in Cherokee, Gilmer, and Pickens Counties are mapped with Ashe soils.

Representative profile of Edneyville stony loam, 25 to 60 percent slopes:

O1—3 to 2 inches, partly decomposed hardwood leaves and twigs.

O2—2 inches to 0, unrecognizable organic humus.

A1—0 to 3 inches, very dark grayish-brown (10YR 3/2) loam; weak, fine, granular structure; very friable; many fine and medium roots; about 15 to 25 percent cobblestones and stone fragments; strongly acid; clear, smooth boundary.

A2—3 to 7 inches, dark yellowish-brown (10YR 4/4) loam; weak, fine, granular structure; very friable; many fine and medium roots; many cobblestones and stone fragments; strongly acid; clear, smooth boundary.

B21t—7 to 18 inches, dark yellowish-brown (10YR 4/4) clay loam; weak, fine, subangular blocky structure; friable; clay films on ped surfaces; many fine mica flakes; common stone fragments; strongly acid; gradual, wavy boundary.

B22t—18 to 30 inches, yellowish-brown (10YR 5/6) clay loam; weak, medium, subangular blocky structure; friable; clay films on ped surfaces; many fine mica flakes; common cobblestones and stone fragments; strongly acid; gradual, wavy boundary.

C1—30 to 46 inches, yellowish-brown (10YR 5/4) fine sandy loam in cracks of soft mica-gneiss saprolite; massive; very strongly acid.

C2—46 to 52 inches +, yellowish-brown (10YR 5/4) weathered gneiss saprolite.

The A horizon is stony; the content of stones ranges from common to many. The A1 horizon ranges from very dark grayish brown through brown. The A2 horizon is dark yellowish brown through yellowish brown. The Bt horizon ranges from loam through clay loam and sandy clay loam. It is generally yellowish brown, but ranges through strong brown. Thickness of the solum ranges from 20 to 40 inches. The depth to hard rock ranges from 3½ to 5 feet.

Edneyville soils occur mainly with Ashe, Porters, and Tusquitee soils. They have a thinner A horizon than Porters soils and have a more clayey B horizon than Ashe soils. They have a thinner solum than Tusquitee soils.

Grover Series

The Grover series consists of well-drained upland soils on broad, fairly uniform ridgetops and side slopes. These residual soils formed in saprolite of quartz mica-schist and micaceous gneiss. Slopes range from 2 to about 15 percent.

Typically, the surface layer is dark grayish-brown fine sandy loam about 2 inches thick. It is underlain by yellowish-brown fine sandy loam about 6 inches thick. The subsoil is about 30 inches thick. It is yellowish-brown sandy clay loam in the uppermost 5 inches; strong-brown clay loam in the next 14 inches; and strong-brown loam mottled with yellowish red in the lowermost 11 inches. Below the subsoil, to a depth of about 60 inches, is weathered saprolite of micaceous gneiss.

Grover soils are low in natural fertility and organic-matter content and are very strongly acid. Permeability is moderate; the available water capacity is medium. Tilth is good, and the root zone is moderately deep.

These soils are suited to a wide range of crops. Reponse to management is good, especially to fertilization. About 60 percent of the acreage is wooded, and the rest is pastured or cultivated. The vegetation is oaks, hickory, dogwood, sourwood, yellow-poplar, sweetgum, and pine.

Representative profile of Grover fine sandy loam, 2 to 6 percent slopes, in a wooded area:

O1—1 inch to 0, partly decomposed leaves, twigs, debris.

A1—0 to 2 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; very strongly acid; clear, smooth boundary.

A2—2 to 8 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; very strongly acid; clear, wavy boundary.

B1—8 to 13 inches, yellowish-brown (10YR 5/8) sandy clay loam; weak, medium, subangular blocky structure; very friable; common fine mica flakes; many fine roots; very strongly acid; clear, wavy boundary.

B2t—13 to 27 inches, strong-brown (7.5YR 5/6) clay loam; moderate, medium, subangular blocky structure; friable; clay films on some ped surfaces; many fine and very fine mica flakes giving a slick or greasy feel; very strongly acid; clear, wavy boundary.

B3—27 to 38 inches, strong-brown (7.5YR 5/6) loam; common fine, faint mottles of yellowish red (5YR 5/8); weak, medium, subangular blocky structure; very friable; common black saprolite streaks; many very fine mica flakes; many fine roots; very strongly acid; gradual, wavy boundary.

C—38 to 60 inches +, yellowish-brown (10YR 5/8) partly weathered, soft, loamy saprolite of micaceous gneiss with reddish-black and brown streaks; massive; many fine mica flakes; rock structure evident before crushed.

The A horizon is mostly fine sandy loam but is sandy loam in a few areas. It ranges from 5 to 12 inches in thickness. In cultivated areas the plow layer is yellowish brown, light olive brown, or brown. The B2t horizon ranges from clay loam to sandy clay loam. There are common to many very fine to fine mica flakes within the B horizon. Thickness of the solum averages about 38 inches but ranges from 24 to 48 inches. Soft weathered saprolite underlies the solum at a depth of about 3 or 4 feet, but generally hard rock is at a depth of more than 10 feet.

Grover soils occur mainly with Madison, Hayesville, and Tallapoosa soils. Their B horizon is less clayey and not so red as that of Madison and Hayesville soils. Grover soils are deeper over bedrock than Tallapoosa soils.

Grover fine sandy loam, 2 to 6 percent slopes (GiB).—This well-drained soil is on broad upland ridgetops. It has the profile described as representative for the series. Areas are 10 to 20 acres in size. In cultivated areas the surface layer is brown to yellowish brown. Included in mapping are a few eroded areas and small areas of Madison and Hayesville soils.

This Grover soil responds to good management and is well suited to a wide range of locally grown crops. Tilth is good. Erosion is a moderate hazard in cultivated areas. (Capability unit IIe–2; woodland group 3o7)

Grover fine sandy loam, 6 to 10 percent slopes, eroded (GiC2).—This well-drained upland soil is on fairly broad ridgetops and side slopes. Areas are about 10 to 20 acres in size. The surface layer is light olive-brown fine sandy loam 5 to 8 inches thick. The subsoil is micaceous sandy clay loam. Included in mapping are small, slightly eroded wooded areas, a few shallow gullies and rills, and small areas of Hayesville and Madison soils.

Except in the more eroded areas, this Grover soil is easy to work. The erosion hazard is moderate to severe. If well managed, this soil is suited to a wide range of crops and pasture plants. The acreage is small, and most of it is in pasture or woodland. (Capability unit IIIe–2; woodland group 3o7)

Grover fine sandy loam, 10 to 15 percent slopes (GiD).—This well-drained soil is on moderately long side slopes. Areas are 10 to 25 acres in size. The surface layer is light olive-brown to dark grayish-brown fine sandy loam 7 to 12 inches thick. The subsoil is sandy clay loam. The combined thickness of the surface layer and the subsoil ranges from 24 to 36 inches. Included in mapping are a few eroded to severely eroded areas where there are shallow gullies and a few deep gullies, and small areas of Hayesville and Tallapoosa soils.

This Grover soil is suited to a fairly wide range of crops and can be cultivated occasionally. Surface runoff is rapid. Erosion is a severe hazard. The total acreage is fairly small, and most of it is wooded. (Capability unit IVe–1; woodland group 3o7)

Gwinnett Series

The Gwinnett series consists of well-drained soils on rolling ridgetops and hillsides. These soils formed in material weathered chiefly from a mixture of gneiss, biotite, hornblende, schist, and other basic rocks. Slopes range from 2 to about 25 percent.

Typically, the surface layer is dark reddish-brown loam about 6 inches thick. The subsoil, about 30 inches thick, is dark-red clay and clay loam. Below this, to a depth of 52 inches, is mainly broken and weathered rock.

These soils are low in natural fertility and organic-matter content and are strongly acid to medium acid. Available water capacity is medium, and permeability is moderate. The root zone is moderately deep, and tilth is good in the less eroded areas.

These soils are suited to a wide range of crops, although most of the acreage is woodland or pasture. The native vegetation is chiefly white oak, post oak, red oak, hickory, sassafras, dogwood, and shortleaf pine. The areas formerly cultivated but now abandoned are in shortleaf, loblolly, and Virginia pines.

Representative profile of Gwinnett loam, 6 to 10 percent slopes, eroded:

Ap—0 to 6 inches, dark reddish-brown (2.5YR 2/4) loam; weak, medium, subangular blocky structure; friable; many fine roots and very fine mica flakes; about 5 percent gravel fragments; strongly acid; clear, smooth boundary.

B2t—6 to 24 inches, dark-red (2.5YR 3/6) clay; moderate, medium, subangular blocky structure; slightly firm; few fragments of weathered soft mica-gneiss; clay films on some ped surfaces; common very fine mica flakes; strongly acid; gradual, irregular boundary.

B3t—24 to 36 inches, dark-red (2.5YR 3/6) clay loam; moderate, medium, subangular blocky structure; friable; about 5 percent weathered, light and soft, brownish fragments; clay films on some ped surfaces; strongly acid; gradual, wavy boundary.

C1—36 to 44 inches, mixed, soft, weathered, yellowish-brown (10YR 5/8) rock and red (2.5YR 3/6) clay loam; weak, medium, subangular blocky structure; medium acid; broken, irregular boundary.

C2—44 to 52 inches +, weathered, hard and soft, broken rocks; black manganese coating in cracks and seams.

The A horizon is dark reddish brown, reddish brown, or dark red. In wooded areas the A1 horizon is dark brown. The surface layer is chiefly loam or sandy loam, but in some eroded to severely eroded areas, it is sandy clay loam. The B2t horizon ranges from dark red to red in color and from clay to clay loam in texture. Thickness of the solum is commonly about 36 inches but ranges from 24 to 45 inches. Iron concretions, pieces of quartz, and weathered rocks, pebbles, and cobblestones are mainly few but range to common. Hard bedrock is ordinarily deeper than 6 feet.

Gwinnett soils are associated with Musella, Madison, and Hayesville soils. They have a redder A horizon and a darker red B horizon than Hayesville and Madison soils. They are less micaceous throughout the solum than Madison soils. They have a thicker Bt horizon, have fewer coarse fragments in the solum, and are deeper over bedrock than Musella soils.

Gwinnett loam, 2 to 6 percent slopes, eroded (GgB2).—This soil formed on fairly broad ridgetops. Areas are about 5 to 20 acres in size. The surface layer is reddish-brown to dark reddish-brown loam. The subsoil is dark-red or red clay to clay loam. Plowing has exposed the subsoil in some areas. There are a few shallow gullies and rills in many areas. Included in mapping are small areas of Madison and Hayesville soils and areas of a similar soil in which the combined thickness of the surface layer and the subsoil is greater than 50 inches.

This Gwinnett soil can be cultivated intensively, but the hazard of further erosion is slight to moderate. Pasture, wheat, and most other locally grown crops are suited. Most of the acreage has been cultivated. (Capability unit IIe-1; woodland group 3o7)

Gwinnett loam, 6 to 10 percent slopes, eroded (GgC2).—This soil is on narrow ridgetops. Areas are about 5 to 20 acres in size. There are a few shallow gullies and rills in some areas. This soil has the profile described as representative for the series. Included in the mapping are areas of a similar soil in which the combined thickness of the surface layer and the subsoil is more than 50 inches. Also included are small areas of Madison and Hayesville soils.

This Gwinnett soil is suited to a wide range of locally grown crops. If well managed, it is suited to cultivated crops. The response to management is good. Tilth is good except in the eroded areas. Erosion is a moderate to severe hazard in cultivated areas. (Capability unit IIIe-1; woodland group 3o7)

Gwinnett loam, 10 to 25 percent slopes, eroded (GgE2).—This soil is on side slopes and ridgetops, in areas of about 5 to 30 acres. Except for a 6- to 10-inch thinner surface layer and subsoil, it has the profile described as representative of the series. There are a few rills, severely eroded spots, and deep gullies in places. Included in mapping are small areas of Musella, Hayesville, and Madison soils.

This Gwinnett soil is too steep to be suited to cultivated crops. It needs to be well managed if used for pasture. The variety of grasses and legumes that can be grown is limited. Most of the acreage is in hardwoods and pines. (Capability unit VIe-2; woodland group 3r8)

Gwinnett sandy clay loam, 2 to 6 percent slopes, eroded (GdB2).—This soil is on fairly broad ridgetops, in areas of about 5 to 20 acres. The present surface layer, which is mostly material brought up from the subsoil, is reddish-brown to dark reddish-brown sandy clay loam. It is underlain by dark-red clay to clay loam. In most areas there are shallow gullies and rills. Included in mapping are a few areas in which the surface layer is loam or sandy loam, and small areas of Madison and Hayesville soils.

This Gwinnett soil is suited to most locally grown crops. It has fair tilth but becomes cloddy when dry because of the high content of clay. The response to management is good. The hazard of further erosion is moderate in cultivated areas. All the acreage has been cleared, but more than half is now wooded. (Capability unit IIe-1; woodland group 3o7)

Gwinnett sandy clay loam, 6 to 15 percent slopes, severely eroded (GdD3).—This soil is on narrow ridgetops and hillsides. Areas are 5 to 25 acres in size. The present surface layer, which is largely subsoil material, is reddish-brown to dark-red sandy clay loam. It is underlain by dark-red clay to clay loam. Shallow gullies and rills occur in most areas. Included in mapping are areas where there are pebbles and cobblestones on the surface and in the surface layer and the subsoil, and small areas of Madison, Hayesville, and Musella soils.

This Gwinnett soil is better suited to perennial vegetation than to other uses. The slope and slow infiltration make runoff moderately rapid. Consequently, the hazard of further erosion is severe in cultivated areas. Most of the acreage has been cultivated, but about 75 percent of it is now pine forest. (Capability unit IVe-1; woodland group 4c2)

Gwinnett sandy clay loam, 15 to 25 percent slopes, severely eroded (GdE3).—This soil is on long or short hillsides. Areas range from 5 to 35 acres in size. The present surface layer consists mostly of material from the upper part of the subsoil. It is dark-red or dark reddish-brown sandy clay loam. The combined thickness of the surface layer and the subsoil is about 24 to 30 inches. There are many shallow V-shaped gullies 3 to 6 feet deep. In some areas gullies penetrate to the weathered rock. Some small areas have an intricate pattern of deep gullies. Included in the mapping are small areas of Wilkes and Musella soils.

This soil has poor tilth, rapid surface runoff, and a very severe erosion hazard. It is best suited to perennial vegetation or trees. All the acreage is woodland. (Capability unit VIe-2; woodland group 4c2)

Hayesville Series

The Hayesville series consists of well-drained soils on uplands, on narrow ridgetops, and on irregular hillsides. These soils formed in material weathered from granite, gneiss, and schist. Slopes range from 2 to 25 percent.

Typically, the surface layer is fine sandy loam about 7 inches thick. It is dark grayish brown in the upper part and strong brown in the lower part. The subsoil, which extends to a depth of about 35 inches, is yellowish-red and red clay or clay loam. Below this is mainly saprolite from mica-gneiss. This material extends to a depth of about 60 inches.

Hayesville soils are low in organic-matter content and natural fertility and are strongly acid. Permeability is moderate, and the available water capacity is medium. The root zone is moderately deep, and tilth is good in most areas.

These soils are well suited to most locally grown crops, and the response to management is good. Most of the acreage has been cleared and cultivated but now is woodland. Some areas are cultivated and pastured. Apples are grown in some areas. Native vegetation is chiefly oak, hickory, yellow-poplar, sweetgum, and pine.

Representative profile of Hayesville fine sandy loam, 6 to 10 percent slopes, in a wooded area:

Ap1—0 to 3 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, fine granular structure; very friable; many fine roots; strongly acid; abrupt, wavy boundary.

Ap2—3 to 7 inches, strong-brown (7.5YR 5/6) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; 3 percent small pebbles; strongly acid; clear, wavy boundary.

B1t—7 to 11 inches, yellowish-red (5YR 4/8) clay loam; moderate, fine, subangular blocky structure; friable; many fine roots; some clay bridging; few pebbles; strongly acid; clear, wavy boundary.

B2t—11 to 29 inches, red (2.5YR 4/6) clay; moderate, medium, subangular blocky structure; firm; many fine roots;

clay films on ped surfaces; few fine mica flakes; strongly acid; gradual, wavy boundary.

B3t—29 to 35 inches, red (2.5YR 4/6) clay; moderate, medium, subangular blocky structure; firm; few fine roots; some clay films on ped surfaces; many very fine mica flakes; 10 to 15 percent weathered mica-gneiss or schist; strongly acid; gradual, irregular boundary.

C1—35 to 49 inches, about 80 percent light olive-brown, weathered mica-gneiss saprolite; massive; small pockets of red (2.5YR 4/6) clayey material.

C2—49 to 60 inches +, grayish, weathered, soft, mica-gneiss saprolite; massive; a few fragments coated with red clay.

The A horizon ranges from 3 to 10 inches in thickness and is fine sandy loam, sandy loam, or sandy clay loam. The Ap horizon is dark grayish brown, strong brown, dark brown, or yellowish red. The Bt horizon ranges from yellowish red to red in color and from clay loam to clay in texture. Fine mica flakes range from none to common in this horizon. The thickness of the solum averages about 36 inches but ranges from 21 inches to 50 inches. The B3t horizon has an irregular to wavy lower boundary overlying the saprolite. In most places depth to bedrock is greater than 6 or 7 feet.

Hayesville soils occur mainly with Madison, Tallapoosa, Gwinnett, and Grover soils but have a cooler mean annual temperature than any of those soils, They resemble Madison soils but have fewer mica flakes in the solum. They have a thicker solum than Tallapoosa soils and are not so micaceous. They lack the red colors of Gwinnett soils. They have a more clayey B horizon than Grover soils.

Hayesville fine sandy loam, 2 to 6 percent slopes (HIB).—This well-drained soil is on fairly broad ridgetops. In most places it is about 6 inches deeper over rock than the soil described as representative for the series. There are a few shallow washes and rills and in old roadways, a few deep gullies. Included in mapping are small areas of Madison and Gwinnett soils and areas of similar soils that have an average temperature of more than 59° F.

This Hayesville soil is well suited to most locally grown crops. Most of the acreage has been cleared and cultivated or pastured. Frequent applications of fertilizer are needed. The erosion hazard is slight to moderate in cultivated areas. (Capability unit IIe–2; woodland group 2o7)

Hayesville fine sandy loam, 6 to 10 percent slopes (HIC).—This soil is on ridgetops. It has the profile described as representative for the series. There are a few galled areas and rills and a few gullies. Included in mapping are areas of similar soils in the southern part of the survey area that have an average temperature of more than 59° F. and small areas of Madison and Gwinnett soils.

This Hayesville soil is fairly well suited to most locally grown crops. It can be used fairly intensively for crops and pasture. The response to management is good. Surface runoff is medium, and the hazard of further erosion is moderate to severe in cultivated areas. Most of the acreage has been cleared and cultivated. (Capability unit IIIe–2; woodland group 2o7)

Hayesville fine sandy loam, 10 to 25 percent slopes (HIE).—This soil is on side slopes. The surface layer and the subsoil combined are about 6 to 10 inches thinner than in the profile described as representative for the series. Included in mapping are eroded areas and a few gullies, small areas steeper than 25 percent, some areas of Tallapoosa soils, and areas of similar soils in the southern part of the survey area that have an average temperature of more than 59° F.

This Hayesville soil is too steep for cultivation, but it is well suited to permanent vegetation and trees. The eroded areas have been cleared and cultivated but are now wooded. (Capability unit VIe–1; woodland group 2r8)

Hayesville sandy clay loam, 2 to 10 percent slopes, severely eroded (HJC3).—This soil is on ridgetops. The surface layer is yellowish-red sandy clay loam 3 to 5 inches thick. It is a mixture of the original surface layer and material from the upper part of the subsoil. The subsoil is red clay to clay loam. There are many shallow gullies and a few gullies 3 to 5 feet deep. Included in mapping are small areas of the Madison and Gwinnett soils and areas of similar soils that have an average temperature of more than 59° F.

This Hayesville soil is better suited to perennial vegetation than to cultivated crops. The hazard of further erosion is moderate to severe in cultivated areas. Most of the acreage has been cleared and cultivated; now more than half is pasture or trees. (Capability unit IVe–1; woodland group 2c2)

Hayesville sandy clay loam, 10 to 25 percent slopes, severely eroded (HJE3).—This soil is on side slopes and sharp ridgetops. The surface layer is yellowish-red sandy clay loam 3 to 5 inches thick. It is a mixture of the original surface layer and the upper part of the subsoil. The subsoil is red clay to clay loam. Depth to weathered saprolite is 22 to 32 inches. Many shallow gullies and a few scattered, deep gullies have formed in most areas. Included in mapping are a few areas of Tallapoosa soils and areas of similar soils that have an average temperature of more than 59° F.

If fertilized and otherwise well managed, this soil is suited to tall fescue for pasture. The erosion hazard is very severe unless the soil is kept in permanent cover. About one-fourth the acreage is in pasture, and the rest is woodland, mostly pine. (Capability unit VIIe–1; woodland group 2c2)

Helena Series

The Helena series consists of moderately well drained soils on fairly smooth uplands. These soils formed in residuum weathered from hornblende-gneiss cut by dikes of quartz, diorite, and gabbro. Slopes range from 2 to 10 percent.

Typically, the surface layer is light olive-brown sandy loam in the upper 6 inches and olive-yellow sandy loam in the lower 4 inches. The subsoil is yellowish-brown clay and sandy clay mottled with gray and brown and about 33 inches thick. Below this, to a depth of about 54 inches, is light-gray sandy clay loam mottled with light olive brown.

These soils are low in natural fertility and organic-matter content and are strongly acid to very strongly acid. The available water capacity is medium, and permeability is slow. Tilth is good.

These soils are better suited to pasture, hay crops, and woodland than to other uses. The clayey subsoil limits their suitability for most cultivated crops. Most of the acreage has been cultivated, but now about half is in pasture or hay crops and the rest is woodland. The native vegetation was chiefly sweetgum, ash, hickory, yellow-poplar, dogwood, willow, and pine.

Representative profile of Helena sandy loam, 2 to 10 percent slopes:

Ap—0 to 6 inches, light olive-brown (2.5Y 5/6) sandy loam; weak, fine, granular structure; friable; many fine roots; few quartz fragments; very strongly acid; clear, smooth boundary.

A3—6 to 10 inches, olive-yellow (2.5Y 6/6) sandy loam; moderate, medium, granular structure; friable; many fine roots; few quartz fragments; very strongly acid; clear, wavy boundary.

B21t—10 to 32 inches, yellowish-brown (10YR 5/4) clay; common, fine, prominent mottles of reddish brown and distinct mottles of light olive brown and grayish brown; strong, medium and coarse, angular and subangular blocky structure; very firm; clay films on ped surfaces; strongly acid; gradual, wavy boundary.

B22t—32 to 43 inches, yellowish-brown (10YR 5/6) sandy clay; many, distinct, light-gray (2.5Y 7/2) mottles; moderate, medium, subangular blocky structure; very firm; clay films on ped surfaces; strongly acid; gradual, wavy boundary.

C—43 to 54 inches +, light-gray (5Y 7/2) sandy clay loam; faint, light olive-brown mottles; massive; common; firm; many fine mica flakes; strongly acid.

The A horizon is mostly sandy loam and ranges from light olive brown to light brownish gray in color. The B21t horizon ranges from yellowish-brown to brownish-yellow sandy clay to clay and has prominent to faint reddish-brown, light olive-brown, and grayish-brown mottles. Pebbles and cobblestones range from none to common. The solum ranges from 30 to 46 inches in thickness. The depth to hard rock is 3 to 5 feet.

Helena soils occur mostly with Wilkes, Gwinnett, and Hayesville soils. They have a thicker, more clayey B horizon than Wilkes soils. They differ from Gwinnett and Hayesville soils in having a mottled yellowish-brown B2t horizon.

Helena sandy loam, 2 to 10 percent slopes (HYC).—This soil is on fairly smooth uplands. Areas are about 5 to 20 acres in size. Included in the mapping are a few eroded areas, small severely eroded areas, areas of a soil similar to this soil but grayer and slightly wetter, and areas of Wilkes soils.

This Helena soil is limited in its suitability for crops. The response to management is only fair. Most of the acreage has been cultivated, but about half of it is now in pasture or hay crops, and the rest is woodland. (Capability unit IIIe-4; woodland group 2w8)

Hiwassee Series

The Hiwassee series consists of well-drained soils that formed in old alluvium, commonly residuum from quartz and mica-gneiss. The soils are on broad ridgetops of old stream terraces, chiefly near the major streams and rivers. Slopes range from 2 to 15 percent.

Typically, the surface layer is very dusky red in the uppermost 6 inches and dark reddish-brown clay in the lowermost 3 inches. The subsoil of dusky red clay to clay loam extends to a depth of 6 feet or more (fig. 6).

These soils are moderate to low in organic-matter content and natural fertility and are strongly acid. The available water capacity is medium, and permeability is moderate. The root zone is deep, and tilth is good in most areas.

These soils are well suited to most locally grown crops. They are among the best soils in the three counties for farming. The response to management is good. The vegetation is chiefly mixed hardwoods and scattered pines. Many areas have been cleared and cultivated, but many areas have been abandoned and have reverted to shortleaf and loblolly pines.

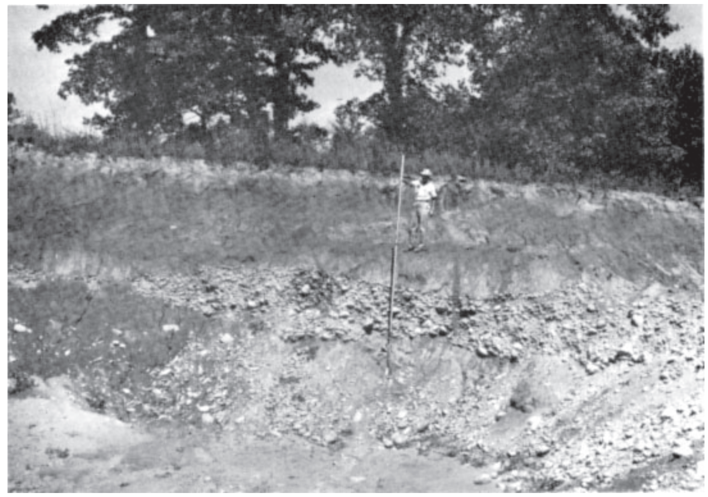

Figure 6.—**Profile of a Hiwassee soil showing rounded pebbles underlying old alluvium.**

Representative profile of Hiwassee loam, 6 to 10 percent slopes:

Ap—0 to 6 inches, very dusky red (2.5YR 2/2) loam; moderate, fine, granular structure; friable; many fine roots; strongly acid; clear, smooth boundary.

A3—6 to 9 inches, dark reddish-brown (2.5YR 2/4) clay loam; moderate, medium, granular and subangular blocky structure; friable; many fine roots; strongly acid; clear, smooth boundary.

B21t—9 to 58 inches, dusky red (10R 3/4) clay; moderate, medium, subangular and angular blocky structure; firm; many fine roots; clay films on ped surfaces; few small, black concretions; strongly acid; clear, wavy boundary.

B22t—58 to 88 inches +, dusky red (10R 3/4) clay loam; moderate, medium, subangular blocky structure; firm; clay films on ped surfaces; few small, black concretions; strongly acid.

The A horizon ranges from dark reddish brown to very dusky red. This horizon is loam in most areas but is clay loam in severely eroded areas. The B2t horizon is dusky red clay or clay loam in most areas; in some it is red clay loam. Depth to gravel and unconsolidated bedrock ranges from 6 to many feet. In most areas there are few or no pebbles and cobblestones on the surface and throughout the solum.

Hiwassee soils occur mainly with Wickham, Masada, Madison, and Hayesville soils. They are generally thicker and redder throughout than the associated soils.

Hiwassee loam, 2 to 6 percent slopes (HSB).—This soil formed on fairly broad upland terraces, in areas of about 10 to 25 acres. The 6- to 12-inch surface layer is chiefly dark reddish-brown loam. Below this is dark-red to dusky red clay to clay loam that extends to a depth of about 84 inches in places. Included in mapping are a few severely eroded spots and areas in which the subsoil is yellowish-red to red clay loam.

If well managed, this soil is suited to most locally grown crops. Tilth is good except in the severely eroded areas. About half the acreage is in cultivated crops; the rest is in pasture, hay crops, and woodland. Erosion is a slight to moderate hazard in cultivated areas. (Capability unit IIe-1; woodland group 3o7)

Hiwassee loam, 6 to 10 percent slopes (HSC).—This soil formed on upland terraces, in areas of about 10 to 25 acres. It has the profile described as representative for the Hiwassee series. Included in mapping are a few eroded areas, a few severely eroded spots, and a few small areas where the subsoil is yellowish-red to red clay loam and is several inches thinner than is typical for this Hiwassee soil.

This soil is suited to most locally grown crops. In cultivated areas, surface runoff is medium to rapid and the erosion hazard is moderate to severe. The response to management is good, especially to fertilization. More than half the acreage is in crops or pasture, and the rest is woodland. (Capability unit IIIe–1; woodland group 3o7)

Hiwassee clay loam, 6 to 15 percent slopes, severely eroded (HTD3).—This soil occurs as areas of about 10 to 25 acres. Erosion has removed nearly all the original surface layer. The present surface layer is a mixture of dark reddish-brown and dusky red clay loam, which is mostly material from the subsoil. The subsoil is dark-red or dusky red clay. Shallow gullies are common, and there are a few deep gullies. Included in mapping are a few areas in which the subsoil is yellowish-red to red clay loam.

This soil is not well suited to cultivated crops because of the erosion hazard. It has poor tilth because of the clay loam surface layer. It is well suited to pasture grasses, hay crops, and trees. Most of the acreage is used for these purposes. (Capability unit IVe–1; woodland group 4c2)

Madison Series

The Madison series consists of well-drained soils on fairly smooth, broad ridgetops and hillsides. These soils formed in residual material weathered from quartz mica-schist, mica-schist, and micaceous gneiss. Slopes range from 2 to 15 percent.

Typically, the surface layer is dark-brown fine sandy loam about 6 inches thick. The subsoil is red clay loam and sandy clay loam that extend to a depth of about 33 inches. It is underlain by reddish-brown saprolite that is high in mica and extends to a depth of 42 inches or more.

Madison soils are low in organic-matter content and natural fertility and are strongly acid. Permeability is moderate, and the available water capacity is medium. Tilth is generally good, except in severely eroded areas. The root zone is moderately deep.

These soils are suited to a wide range of locally grown crops. The response to management is good, especially to fertilization. Most of the acreage has been cultivated and the original woodland harvested. Now, about a third of the acreage is cultivated or pastured. The rest is wooded. The native vegetation is chiefly oak, hickory, sweetgum, yellow-poplar, dogwood, sourwood, shortleaf pine, Virginia pine, and loblolly pine.

Representative profile of Madison fine sandy loam, 6 to 10 percent slopes:

Ap—0 to 6 inches, dark-brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; few fine roots; few very fine mica-schist and quartz fragments; strongly acid; abrupt, smooth boundary.

B1—6 to 10 inches, red (2.5YR 5/6) sandy clay loam; weak, fine, subangular blocky structure; friable; few fine roots; few very fine mica fragments; strongly acid; clear, wavy boundary.

B2t—10 to 27 inches, red (2.5YR 4/6) clay loam; moderate, medium, subangular blocky structure; friable; clay films on some ped surfaces; many, fine mica flakes; strongly acid; gradual, wavy boundary.

B&C—27 to 33 inches, red (2.5YR 5/6) sandy clay loam; weak, medium, subangular blocky structure; friable; few clay films on some ped surfaces; about 50 percent tongues into mica-schist saprolite; many mica flakes; strongly acid; gradual, irregular boundary.

C—33 to 42 inches +, reddish-brown (5YR 5/4) saprolite with multicolored streaks of partly weathered mica-schist; massive; strongly acid; some ledges of rock with schisty structure.

The A horizon is fine sandy loam in most areas but is gravelly sandy clay loam in eroded areas. The color is mainly dark brown to yellowish brown but is dark grayish brown in slightly eroded, wooded areas and is yellowish red to reddish brown in eroded areas. The B2t horizon is red sandy clay to clay loam. In some places it has an irregular to broken lower boundary interlaced with weathered schist. Depth to the B2t horizon ranges from 24 to 42 inches. The solum averages about 30 inches in thickness but ranges from 21 to 40 inches. Soft weathered schist underlies the soil, but depth to hard rock generally is more than 10 feet.

Madison soils occur mainly among Hayesville and Tallapoosa soils and to a lesser extent with Gwinnett, Appling, and Grover soils. They have colors similar to those of Hayesville soils, but they are more micaceous. They have a thicker solum and a redder subsoil than Tallapoosa soils and contain fewer schist fragments. Their B horizon is not so red as that of Gwinnett soils, but it is redder than that of Appling and Grover soils.

Madison gravelly sandy clay loam, 2 to 10 percent slopes, eroded (MiC2).—This soil is in areas of about 5 to 20 acres on moderately broad ridgetops and hillsides. Its profile is similar to the one described as representative for the series. The surface layer is a mixture of the original surface layer and material from the upper part of the subsoil. The subsoil is micaceous red clay loam 20 to 30 inches thick. In most areas there are shallow gullies and rills and a few deep ones. Included in the mapping are small areas of Hayesville and Gwinnett soils.

Surface runoff is moderately rapid. Further erosion is a severe hazard in cultivated areas or in bare areas. Tilth is generally poor because of the high clay content in the surface layer. The soil can be tilled within only a narrow range of the moisture content.

This soil is suited to most locally grown crops, but because of the severe erosion hazard, it is better suited to perennial vegetation than to cultivated crops. Most of the acreage has been cultivated; now two-thirds or more of it is pastured or wooded. (Capability unit IIIe–1; woodland group 3o7)

Madison fine sandy loam, 2 to 6 percent slopes (MjB).—This soil is on ridgetops in areas of about 5 to 10 acres. The surface layer and the subsoil combined are generally about 6 inches thicker than those in the profile described as representative for the series. Included in mapping are small areas of Hayesville and Gwinnett soils and a few small areas that have fragments of mica-schist on the surface and more accumulated clay than in the soil described.

This Madison soil is suited to a wide range of locally grown crops. The response to management is good, but erosion is a moderate hazard. Most of the acreage has been cultivated, but now about 60 percent is cropland and pasture, and the rest is woodland. (Capability unit IIe–1; woodland group 3o7)

Madison fine sandy loam, 6 to 10 percent slopes (MjC).—This upland soil is on broad ridgetops and hillsides in areas of about 10 to 25 acres. It has the profile described as representative for the series. Included in the mapping are areas of Hayesville and Gwinnett soils, a few areas that have more accumulated clay in the subsoil than in the soil described, a few shallow gullies and rills, and a few deep gullies in old roadways and trails.

This Madison soil is suited to most locally grown crops. It is subject to moderate erosion in cultivated areas. Frequent applications of fertilizer are needed. The response to management is good. Most of the acreage is pastured or wooded. About one-fourth is cultivated. (Capability unit IIIe-1; woodland group 3o7)

Madison fine sandy loam, 10 to 15 percent slopes (MjD).—This soil is on narrow ridgetops and hillsides in areas of 10 to 25 acres. It is about 6 inches shallower over rock than the soil described as representative for the series.

This soil is eroded in a few places; in other places it has rills, shallow gullies, and a few deep gullies. Fragments of mica-schist and quartz are common on the surface in some areas. Included in mapping are areas of Hayesville, Gwinnett, and Tallapoosa soils.

This Madison soil is better suited to permanent pasture and woodland than to cultivated crops. Most of the acreage has been cultivated; about three-fourths of it is now wooded. Contour tillage and other protective practices are needed to control erosion. (Capability unit IVe-1; woodland group 3o7)

Masada Series

The Masada series consists of well-drained soils that formed in old alluvium on fairly low stream terraces and in colluvium at the base of hillsides. These soils are near or along the larger streams, generally throughout the survey area. Slopes range from 0 to 15 percent.

Typically, the surface layer is dark grayish-brown fine sandy loam in the upper 6 inches and yellowish-brown sandy clay loam in the lower part. The subsoil is yellowish-brown, brownish-yellow, and strong-brown clay loam that extends to a depth of about 50 inches (fig. 7). It has reddish-yellow mottles in the lower part. Below this is mottled pale-yellow, white, and brown loamy material to a depth of about 60 inches. Few to many rounded quartz pebbles are on the surface and throughout the surface layer and the subsoil.

Figure 7.—**Profile of a Masada fine sandy loam showing old alluvium and layer of gravel at a depth of 36 to 48 inches.**

These soils are low in organic-matter content and low to moderate in natural fertility. Permeability is moderate, and the available water capacity is medium. Reaction is strongly acid in the surface layer and the subsoil. The root zone is deep, and tilth generally is good.

These soils are considered among the better soils for farming in the three counties. They are suited to a wide range of crops. Most of the acreage has been cleared and cultivated; now about half is cultivated or pastured. The rest is wooded. The native vegetation is chiefly mixed hardwoods and scattered loblolly and shortleaf pines.

Representative profile of Masada fine sandy loam, 2 to 6 percent slopes:

Ap—0 to 6 inches, dark, grayish-brown (10YR 4/2) fine sandy loam; weak, fine, granular structure; very friable; few cobblestones and pebbles on surface; few fine- and medium-size roots; strongly acid; clear, smooth boundary.

A3—6 to 9 inches, yellowish-brown (10YR 5/4) sandy clay loam; weak, medium, subangular blocky structure; friable; few pebbles; few small roots; strongly acid; clear, smooth boundary.

B21t—9 to 22 inches, strong-brown (7.5YR 5/6) clay loam; moderate, medium, subangular blocky structure; friable; clay films on ped surfaces; strongly acid; gradual, wavy boundary.

B22t—22 to 40 inches, mottled yellowish-brown (10YR 5/8) and strong-brown (7.5YR 5/6) clay loam; common, medium, prominent mottles of reddish yellow (5YR 6/6); moderate, medium, angular blocky structure; firm; clay films on ped surfaces; very fine mica flakes; strongly acid; gradual, wavy boundary.

B3t—40 to 50 inches, brownish-yellow (10YR 6/8) clay loam; common, medium, distinct mottles of reddish yellow (7.5YR 6/6); weak, medium, subangular blocky structure; friable; clay films on some ped surfaces; strongly acid; gradual, wavy boundary.

C—50 to 60 inches +, mottled pale-yellow (2.5Y 8/4), white (10YR 8/2), and brown (10YR 4/3), loamy regolith; massive; many mica flakes; very strongly acid.

The A horizon is mostly fine sandy loam; in some places it ranges from gravelly loam to sandy clay loam. Color is chiefly dark grayish brown, dark yellowish brown, or light yellowish brown, but it is olive gray in some areas. The B2t horizon ranges from sandy clay loam to clay loam, and the color is yellowish brown, strong brown, or brownish yellow. Light yellowish-brown, reddish-yellow, or red mottles are common in the lower part of the solum. Rounded quartz pebbles or cobblestones range from none to many on the surface and throughout the solum. Thickness of the solum averages about 50 inches but ranges from 40 to 50 inches. The depth to hard rock generally is more than 10 feet.

Masada soils occur chiefly with Wickham and Hiwassee soils. They have a mottled yellowish-brown and strong-brown Bt horizon, whereas Wickham soils are free of mottles. These soils are not so red as Hiwassee soils.

Masada gravelly loam, 2 to 10 percent slopes (MpC).—This soil developed on high terraces and in concave depressions. Areas are about 5 to 20 acres in size. The surface layer is olive-gray gravelly loam 5 to 10 inches thick. The subsoil is brownish-yellow sandy clay loam in which there are many pebbles and fragments of cobblestones. This layer extends to a depth of about 40 inches or more. Included in mapping are a few eroded and severely eroded areas, shallow gullies, rills, and a few deep gullies, and areas where only a few pebbles and fragments of cobblestones are on the surface and in the surface layer and the subsoil.

This soil is not well suited to cultivated crops, because most of it contains many pebbles and fragments of cobblestones. It is better suited to pasture and wood crops. Part of the acreage has been cultivated but is now mostly wooded; some is pastured. (Capability unit IIIe-2; woodland group 3o7)

Masada fine sandy loam, 0 to 2 percent slopes (MoA).—This soil is on smooth, low stream terraces. Areas are about 5 to 20 acres in size. The surface layer is dark yellowish-brown fine sandy loam 9 to 12 inches thick. At a depth of about 20 inches, the subsoil is yellowish-brown clay loam and sandy clay loam mottled with light olive brown. Included in mapping are small areas that have a fragipan at a depth of 18 to 24 inches, areas where a thin layer of overwash is on the surface, and small areas of Augusta soils.

This Masada soil is among the best soils in the three counties for farming. It is suited to a wide range of locally grown crops, especially corn and pasture grasses. The response to management is good, especially to fertilization. Flooding occurs occasionally for short periods. Most of the acreage is cultivated or pastured. (Capability unit I-2; woodland group 3o7)

Masada fine sandy loam, 2 to 6 percent slopes (MoB).—This soil is on fairly broad upland terraces, in areas of about 10 to 25 acres. It has the profile described as representative for the series. Included in mapping are eroded spots, rills, and shallow gullies, a few small areas of Wickham soils, areas that have a gravelly substratum at a depth of 40 to 60 inches, and a few areas, within a depth of 20 inches, where the soil is mottled with light brownish gray.

This Masada soil is suited to most locally grown crops. It is used for row crops, truck crops, pasture, and hay crops. The response to management is good. The erosion hazard is moderate. (Capability unit IIe-2; woodland group 3o7)

Masada fine sandy loam, 6 to 10 percent slopes, eroded (MoC2).—This soil occurs on old terraces, in areas of about 15 to 30 acres. It is near the larger streams. It has a surface layer of dark grayish-brown fine sandy loam 4 to 7 inches thick. The subsoil is yellowish-brown and strong-brown clay loam mottled with reddish yellow. In most areas the subsoil extends to a depth of about 50 inches. Included in mapping are a few slightly eroded wooded areas, a few severely eroded areas that have shallow gullies and rills, and small areas of Wickham soils.

This Masada soil is suited to a wide range of locally grown crops. Tilth is good, except where the subsoil is exposed. The response to management is good, especially to fertilization. Because of the slope and runoff, the erosion hazard is moderate to severe. Most of the acreage is well suited to row crops, pasture, and pine trees. (Capability unit IIIe-2; woodland group 3o7)

Masada sandy clay loam, 10 to 15 percent slopes, eroded (MyD2).—This soil is on side slopes and in concave depressions of old alluvium. Areas are about 5 to 25 acres in size. The present surface layer, mostly a mixture of the original surface layer and material from the subsoil, is yellowish-brown sandy clay loam 4 to 7 inches thick. The subsoil is mainly strong-brown clay loam that has distinct mottles of reddish yellow in the lower part. It extends to a depth of about 45 inches. There are a few shallow gullies and a few deep gullies. Included in mapping are a few slightly eroded, wooded areas that have a surface layer of olive-gray gravelly loam and a few severely eroded areas in which the surface layer is clay loam.

This soil is poorly suited to cultivated crops; it is better suited to pasture grasses, permanent vegetation, or woodland. Runoff is rapid and the erosion hazard is severe in cultivated areas. Tilth is poor because of the amount of clay in the surface layer. (Capability unit IVe-1; woodland group 3o7)

Musella Series

The Musella series consists of well-drained to somewhat excessively drained soils on narrow ridgetops and side slopes. These soils formed in residuum weathered from basic rocks, such as diorite, hornblende, schist, and gneiss. Slopes range from 10 to 25 percent.

Typically, the surface layer is dark reddish-brown cobbly loam 6 inches thick. The subsoil is dark-red cobbly clay loam and loam. Between depths of 24 and 48 inches, this material tongues into bedrock.

Musella soils are low in organic-matter content and natural fertility and are medium acid. Permeability is moderate, and the available water capacity is medium to low. Tilth is poor; cobblestones interfere with root penetration.

Most of the eroded areas have been used for cultivated crops, but are not well suited. Most of the acreage is now pasture or forest. The native vegetation is chiefly oaks, hickory, dogwood, and shortleaf and loblolly pines.

Representative profile of Musella cobbly loam, 10 to 25 percent slopes:

Ap—0 to 6 inches, dark reddish-brown (5YR 3/3) cobbly loam; weak, medium, granular structure; very friable; many fine roots; 15 to 25 percent fragments of diorite and gneiss; few pebbles and stones; medium acid; clear, smooth boundary.

B2t—6 to 24 inches, dark-red (2.5YR 3/6) cobbly clay loam; moderate, medium, subangular blocky structure; friable; common fine roots; about 20 to 35 percent gneiss fragments; few clay films on some ped surfaces and rock fragments; medium acid; diffuse, irregular boundary.

B3—24 to 48 inches +, weathered, dark-red (2.5YR 3/6) loam that tongues into fractured bedrock of diorite and hornblende gneiss; a few clay films on rock fragments; medium acid.

The A horizon ranges from dark brown to dark reddish brown in color and is loam, fine sandy loam, or sandy clay loam in texture. Most areas have pebbles and cobblestones on the surface and in the soil. The B2t horizon ranges from red to dark red and is chiefly clay loam to clay. The solum is 20 to 35 percent cobbly and stony fragments. Depth to hard rock ranges from 5 to 8 feet or more.

Musella soils commonly occur with Gwinnett and Wilkes soils. They have a thinner, more cobbly Bt horizon than Gwinnett soils. They have a thicker and redder B horizon than Wilkes soils.

Musella cobbly loam, 10 to 25 percent slopes (MCE).—This is the only Musella soil mapped in the survey area. It occurs on narrow ridgetops and hillsides, in areas of 5 to 20 acres. Pebbles and cobblestones are in the surface layer and the subsoil in most areas. Included in mapping are a few severely eroded areas where the surface layer is red sandy clay loam, areas where rock outcrop is at the surface, and a few areas where the slope is less than 10 percent.

This soil is well suited to trees or other perennial vegetation but is not suited to cultivated crops. The erosion hazard is very severe. Most of the acreage is pasture or woodland. (Capability unit VIIe-2; woodland group 4f3)

Porters Series

The Porters series consists of well-drained soils that formed in residuum weathered from gneiss, granite, and mica-gneiss. These soils are on saddles and sloping ridges at elevations of 2,500 feet and above. Slopes range from 6 to 15 percent.

Typically, the surface layer is very dark grayish-brown loam in the upper 7 inches and dark-brown loam in the lower 3 inches. The subsoil generally is dark yellowish-brown loam to clay loam that extends to a depth of about 36 inches. Below this is mainly weathered gneiss.

These soils are moderate in organic-matter content and natural fertility and are strongly acid to medium acid. Permeability is moderate, and the available water capacity is medium to high. The root zone is moderately deep, and tilth is generally good.

These soils are not well suited to cultivated crops. A few small areas have been cleared and are used for corn and truck crops, but most of the acreage is in native vegetation, chiefly hickory, yellow-poplar, maple, oak, sourwood, black locust, white pine, and Virginia pine. Most areas have an undergrowth of rhododendron, mountain-laurel, and wild azalea.

Representative profile of Porters loam, 6 to 15 percent slopes:

A1—0 to 7 inches, very dark grayish-brown (10YR 3/2) loam; weak, fine, granular structure; very friable; many fine roots; few gravel fragments; strongly acid; clear, smooth boundary.

A3—7 to 10 inches, dark-brown (10YR 4/3) loam; weak, fine, subangular blocky structure; friable; many fine roots; few gravel fragments; strongly acid; clear, smooth boundary.

B2t—10 to 22 inches, dark yellowish-brown (10YR 4/4) loam to clay loam; weak, fine, subangular blocky structure; friable; sand grains coated with clay; few to common, fine mica flakes and fine roots; strongly acid; gradual, wavy boundary.

B3—22 to 36 inches, dark yellowish-brown (10YR 4/4) loam; weak, fine, granular structure; friable; few to common, fine mica flakes; strongly acid; gradual, wavy boundary.

C1—36 to 42 inches, yellowish-brown (10YR 5/4 when crushed) sandy loam; massive; very friable; strongly acid.

C2—42 to 48 inches +, soft, weathered gneiss.

The A horizon is very dark grayish-brown to dark-brown loam 6 to 8 inches thick. The B2t horizon is dark yellowish-brown, brown, or dark-brown clay loam to loam. The clay content ranges between 20 and 35 percent. Thickness of the solum ranges from 20 to 40 inches. Hard gneiss is at a depth of 4 to 6 feet. A few pebbles, cobblestones, and stone fragments are on the surface and throughout the profile.

Porters soils occur mainly with Ashe, Edneyville, and Tusquitee soils. They are similar in color to Ashe soils but have a thicker B horizon and more clay accumulation. They have a thicker A horizon and a browner B horizon than Edneyville soils. Their profile is not so thick as Tusquitee soils, which are commonly at lower elevations.

Porters loam, 6 to 15 percent slopes (PcD).—This is the only Porters soil mapped in the three counties. It is on rolling ridges and saddles of the higher elevations. Areas are 15 to 35 acres in size. Included in mapping are small areas of Ashe and Edneyville soils and areas of soils that contain common to many cobblestones and stone fragments.

This Porters soil is poorly suited to cultivated crops because it generally is in remote areas. Almost all the acreage is native forest. A few small areas on the smoother ridges are cultivated and are used for home gardens. (Capability unit IVe-1; woodland group 2o7)

Rock Land

Rock land (Roc) occurs mainly as steep, irregular, sharp escarpments. Areas are about 1 to 5 acres in size. About 50 to 90 percent of each area is exposed phyllite, marble, and gneiss. Where there is a thin layer of soil material, the vegetation is shrubs, grasses, and mosses and a few hardwoods and scrub pines.

Rock land is not suited to farming. Some areas can be developed for recreation and for food and cover for wildlife. (Capability unit VIIIs-1; woodland group not assigned)

Starr Series

The Starr series consists of well-drained soils that formed in local alluvium weathered from acid igneous and metamorphic rocks. These soils formed in slight depressions around the heads of drains and on low bottom land. They occur as small areas on uplands and as fairly broad areas along the major streams. Slopes are 0 to about 3 percent.

Typically, the surface layer is dark-brown fine sandy loam about 9 inches thick. The subsoil, about 43 inches thick, is yellowish-brown loam and has a few pale-brown mottles below a depth of about 29 inches.

Starr soils are moderate in natural fertility, moderately low in organic-matter content, and medium acid to strongly acid. The available water capacity is high, and permeability is moderately rapid. The root zone is deep, and tilth is good.

Starr soils are among the best soils for farming and are well suited to most locally grown crops. The response to management is good. Most of the acreage is cultivated or pastured. The native vegetation is sweetgum, yellow-poplar, ash, hickory, maple, elm, and pine.

Representative profile of Starr fine sandy loam:

A—0 to 9 inches, dark-brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; common fine roots; common fine mica flakes; medium acid; clear, smooth boundary.

B21—9 to 29 inches, yellowish-brown (10YR 5/6) loam; weak, medium, subangular blocky structure; friable; common fine mica flakes; medium acid; gradual, smooth boundary.

B22—29 to 52 inches +, yellowish-brown (10YR 5/6) loam; few, fine, faint mottles of pale brown; weak, medium, subangular blocky structure; friable; common fine mica flakes; strongly acid; gradual, wavy boundary.

The A horizon is chiefly fine sandy loam but ranges to loam. The Ap horizon is predominantly dark brown but ranges to brown and dark grayish brown. The B2 horizon is mainly yellowish-brown sandy clay loam, loam, or fine sandy loam but ranges to brownish yellow. A few pale-brown to light yellowish-brown mottles are in the B22 horizon. Mica flakes are common to many in most horizons. Concretions and pebbles range from none to few. The thickness of the soil material ranges from 5 feet to several feet.

The brown and dark grayish-brown colors of the A horizon, the yellowish-brown and brownish-yellow colors of the B2 horizon, and the fine sandy loam texture are outside of the defined range for the Starr series. These differences do not alter use and management.

Starr soils occur mainly with Toccoa, Chewacla, Cartecay, and Masada soils. They are finer textured below the A horizon than Toccoa soils. They are better drained than Chewacla and Cartecay soils. They lack the significant amount of accumulated clay in the subsoil that is common in Masada soils.

Starr fine sandy loam (Sta).—This is the only Starr soil mapped in the survey area. It occurs in upland depressions and on fairly long areas on bottom land. Slopes are 0 to about 3 percent. Included in mapping are small areas of Toccoa, Chewacla, Cartecay, and Masada soils, and areas of soils that have layers of coarse sand and gravel.

This Starr soil is one of the best soils for farming. The good tilth, the thick root zone, and the slope make it well suited to intensive use for most locally grown crops and pasture, especially to truck crops and nursery crops. The response to management is good. Occasional flooding is a hazard. (Capability unit I–1; woodland group 1o7)

Talladega Series

The Talladega series consists of moderately steep to very steep, well-drained soils on narrow ridges and hillsides on uplands. These soils formed in material weathered from bedrock, chiefly phyllite, slate, argillite, conglomerate, and quartzite mixed with some gneiss and schist. Slopes range from 10 to 80 percent.

Typically, the surface layer is dark grayish-brown channery loam in the upper 2 inches and dark yellowish-brown channery loam in the lower 7 inches. The subsoil is yellowish-red channery clay loam or silty clay loam that extends to a depth of about 22 inches. Below this is a layer of thinly bedded rock and loamy material. Bedrock is at a depth of about 26 inches.

These soils are very strongly acid and are moderately low in natural fertility. The organic-matter content in the surface layer is moderate. Permeability is moderate, and the available water capacity is low. The root zone is shallow.

These soils are not suited to cultivated crops; most of the acreage is woodland. A few small areas have been cleared and are used for pasture and gardens. The native vegetation is oak, yellow-poplar, hickory, sourwood, dogwood, hemlock, locust, shortleaf pine, Virginia pine, and white pine. Many areas have an undergrowth of rhododendron, mountain-laurel, and wild azalea.

Representative profile of a Talladega channery loam, on a 40 percent slope:

O1—2 inches to 0, leaves, twigs, and similar deciduous litter.

A1—0 to 2 inches, dark grayish-brown (10YR 4/2) channery loam; weak, medium and fine, granular structure; very friable; many medium and fine roots; about 30 percent small fragments; very strongly acid; clear, smooth boundary.

A3—2 to 9 inches, dark yellowish-brown (10YR 4/4) channery loam; weak, medium, granular and fine, subangular blocky structure; friable; common medium and fine roots; about 22 percent small fragments; very strongly acid; gradual, wavy boundary.

Bt—9 to 22 inches, yellowish-red (5YR 5/6) channery clay loam or silty clay loam; weak, medium, subangular blocky structure; friable; few fine and medium roots; about 40 percent small fragments; very strongly acid; gradual, wavy boundary.

C—22 to 26 inches, thinly bedded and broken bluish-black phyllite; coated in seams and cracks with yellowish-red loamy material; a few tongues of the Bt horizon extend into the rock; about 65 percent slaty fragments; gradual, irregular boundary.

R—26 inches +, slate and argillite; bluish-black interior with brown and reddish coatings along fractures and cleavage planes; breaks with difficulty using hand tools.

The A horizon is chiefly channery or flaggy silt loam or loam. The A1 horizon is dominantly dark grayish brown or brown but ranges to very dark gray. The A3 horizon, where present, is dark yellowish brown, dark brown, brown, or light brownish gray. The Bt horizon is broken by rock ledges. It is mostly clay loam and silty clay loam, but in some areas it is silt loam. Clay content is less than 35 percent. This horizon is dominantly yellowish red, strong brown, or yellowish brown, but is dark brown in some areas. The solum ranges from 12 to 24 inches in thickness. The content of fragments ranges from 35 to 50 percent but increases in areas that are shallow over rock. Fine mica flakes are mainly few to none but are common in some areas.

Talladega soils commonly occur with Ashe, Edneyville, and Tallapoosa soils. They have a shallower, redder B horizon than Ashe and Edneyville soils. They have a larger number of hard, fractured rock fragments than the Tallapoosa soils and are less micaceous than those soils.

Talladega flaggy loam, 60 to 80 percent slopes (TeG).—This is a flaggy soil on sharp escarpments. It has a thinner surface layer and subsoil than in the profile described as representative for the series. Rock outcrops are common. Areas are about 15 to 25 acres in size.

All the acreage is woodland, mainly hardwoods and a few pines. The steep slope makes logging difficult in most wooded areas. (Capability unit VIIs–1; woodland group 3x3)

Talladega channery loam, 10 to 25 percent slopes (TRE).—This soil is on narrow ridges and hillsides, in areas of about 15 to 30 acres. It is slightly deeper over rock than the soil described as representative for the series (fig. 8). Included in mapping are areas that have slopes of less than 10 percent, some eroded areas, areas where there are a few shallow and deep gullies, and small areas of Tallapoosa soils.

This Talladega soil is poorly suited to crops. If adequately fertilized and otherwise well managed, it is suited to drought-resistant pasture plants. Because of slope and rapid runoff, the erosion hazard is severe on barren areas. (Capability unit VIIs–1; woodland group 3r2)

Figure 8.—Typical profile of Talladega channery loam, 10 to 25 percent slopes.

Talladega channery loam, 25 to 60 percent slopes (TRF).—This soil is on side slopes, in areas of about 15 to 25 acres. It has the profile described as representative for the series. Included in mapping are small areas of Tallapoosa soils, a few rock outcrops, and a few deep gullies.

Because of the steep slopes, the erosion hazard is very severe in barren areas. Runoff is rapid. All the acreage is woodland. The dominant vegetation is hardwood, but there are a few scattered pines. (Capability unit VIIs-1; woodland group 3r3)

Tallapoosa Series

The Tallapoosa series consists of well-drained soils that formed in residuum weathered mainly from mica-schist and to some extent from mica-gneiss and granite. These soils are on narrow ridges and deeply dissected side slopes. Slopes are 6 to about 60 percent.

Typically, the surface layer is brown fine sandy loam about 3 inches thick. It is underlain by about 7 inches of strong-brown fine sandy loam. The subsoil is yellowish-red silty clay loam about 8 inches thick. Below the subsoil, to a depth of 26 inches or more, is schist and gneiss saprolite. This material protrudes upward into the subsoil. There are channery and cobbly fragments in most areas.

Tallapoosa soils are low in natural fertility and organic-matter content and are very strongly acid. Permeability is moderate. The available water capacity is low. The root zone is shallow. Tilth is generally poor because of the coarse fragments.

None of the acreage is considered suitable for farming. Most of it is woodland and pasture. Some of the smoother slopes are cropland. The native vegetation is chiefly oak, sweetgum, hickory, and pine.

Representative profile of Tallapoosa fine sandy loam, 15 to 25 percent slopes, in a wooded area:

O1—1 inch to 0, partly decomposed leaf litter from deciduous trees.

A1—0 to 3 inches, brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; few fine mica flakes; many fine and coarse roots; common fragments of schist rocks and quartz; very strongly acid; clear, smooth boundary.

A2—3 to 10 inches, strong-brown (7.5YR 5/8) fine sandy loam; weak, fine, granular structure; very friable; many fine mica flakes; 20 percent broken fragments of mica-schist; many fine roots; very strongly acid; clear, wavy boundary.

Bt—10 to 18 inches, yellowish-red (5YR 5/8) silty clay loam; weak, fine, subangular blocky structure; friable; many fine mica flakes; about 15 percent broken fragments of mica-schist; few fine roots; very strongly acid; gradual, irregular boundary.

C—18 to 26 inches +, reddish-brown (2.5YR 5/4), broken, weathered mica-schist saprolite streaked with brownish and whitish colors; massive; saprolite showing rock structure in some places.

The A horizon ranges from 4 to 12 inches in thickness, from fine sandy loam, silt loam, or loam to gravelly sandy clay loam, cobbly sandy loam, or channery sandy loam in texture, and from brown to dark brown and yellowish red in color. The Bt horizon varies in texture and thickness. In most places it is about 4 to 10 inches thick and is yellowish-red, red, or yellowish-brown silty clay loam or sandy clay loam. There are few to many mica flakes within all horizons. Depth to weathered mica-schist saprolite is commonly about 18 inches but ranges from 8 to 20 inches. In most areas there are common to many channery, gravelly, and cobbly fragments on the surface and within the solum. Depth to hard gneiss and schist bedrock is commonly more than 5 feet.

Tallapoosa soils are closely associated with Madison soils, generally throughout all three counties. They occur to a lesser extent with Talladega and Dekalb soils. They are not so red as Madison soils and have a thinner solum than those soils. They are more micaceous and less fragmental than Talladega soils. They have a more clayey B horizon than Dekalb soils.

Tallapoosa cobbly sandy loam, 10 to 25 percent slopes (TbE).—This is a shallow soil on ridges and long, dissected side slopes. Areas are 10 to 35 acres in size. The surface layer is dark-brown to brown cobbly sandy loam 6 to 12 inches thick. The subsoil is red or yellowish-red sandy clay loam that varies in thickness within a distance of a few feet. The combined thickness of the surface layer and the subsoil is about 16 to 20 inches. The bedrock is bedded schist and gneiss. Included in mapping are areas that have a coarse-textured surface layer and have bedrock just below the surface, a few small areas that are moderately eroded, a few deep gullies, and small areas of Talladega soils.

The slope, the low fertility, and the coarse fragments make this Tallapoosa soil better suited to perennial vegetation and trees than to cultivated crops. Most of the acreage is woodland. (Capability unit VIIs-1; woodland group 4r2)

Tallapoosa cobbly sandy loam, 25 to 60 percent slopes (TbF).—This is a shallow soil that occurs as short broken areas or long dissected areas about 10 to 40 acres in size. The surface layer is brown cobbly sandy loam 6 to 12 inches thick. The subsoil is a thin layer of yellowish-red or red sandy clay loam. The combined thickness of the surface layer and the subsoil ranges from 12 to 20 inches. Included in mapping are many areas where there is no subsoil development and bedrock is just below the surface layer, areas where bedrock is a mixture of schist and gneiss, a few areas where there are stony fragments within the soil, and areas of rock outcrops.

Because of the steep slopes and the stones and cobblestones, this Tallapoosa soil is not suited to crops or pasture. All the acreage is woodland. (Capability unit VIIs-1; woodland group 4r3)

Tallapoosa channery sandy loam, 25 to 60 percent slopes (TjF).—This is a shallow soil on dissected side slopes. Areas are 10 to 35 acres in size. The profile of this soil is similar to the one described as representative for the series, except for being consistently shallower. Fragments of mica-schist are common on the surface and within the soil. Included in the mapping are small areas of cobbly soils, a few rock outcrops, and areas of Talladega soils.

The steep slope, the very severe erosion hazard, the shallow root zone, and the low fertility make this Tallapoosa soil better suited to perennial vegetation or woodland than to cultivated crops. All the acreage is wooded. (Capability unit VIIs-1; woodland group 4r3)

Tallapoosa fine sandy loam, 6 to 15 percent slopes (TcD).—This is a shallow soil on narrow ridgetops and side slopes. Areas are about 5 to 20 acres in size. The subsoil is slightly thicker than that in the profile described as representative for the series. Included in the mapping are small eroded areas, a few deep gullies, areas of gravelly or channery soils, and areas of Madison and Talladega soils.

The hazard of erosion is severe in cultivated areas. The slope, the low fertility, and the severe hazard of erosion make this Tallapoosa soil better suited to perennial vegetation than to cultivated crops. The smoother areas have been cultivated, but now most of the acreage is pastured or wooded. (Capability unit VIe–3; woodland group 4o1)

Tallapoosa fine sandy loam, 15 to 25 percent slopes (TcE).—This is a shallow soil on side slopes and broken ridges. Areas are about 10 to 30 acres in size. This soil has the profile described as representative for the series. Included in mapping are areas that are eroded and have a few deep gullies and small areas of Madison and Talladega soils. In places there are a few schist fragments on the surface.

The steep slope, the severe erosion hazard, and the shallow root zone make this Tallapoosa soil better suited to perennial vegetation or permanent woodland than to cultivation. Most of the acreage is wooded. (Capability unit VIIe–2; woodland group 4r2)

Tallapoosa gravelly sandy clay loam, 10 to 25 percent slopes, eroded (ThE2).—This soil is on narrow ridgetops and hillsides. Areas are 10 to 30 acres in size. This soil has common to many pebbles on the surface and is commonly 8 to 18 inches thick over bedrock. Otherwise, its profile is similar to the one described as representative for the series. The surface layer is yellowish-red gravelly sandy clay loam 4 to 6 inches thick. There are many galled spots and shallow gullies and a few gullies 3 to 6 feet deep.

This soil has poor tilth because of the clayey surface layer. Surface runoff is rapid on bare surfaces. The steep slopes and rapid runoff make further erosion a very severe hazard.

This soil is best suited to perennial vegetation or trees. Most of the acreage has been cultivated, but now nearly all of it is in pine trees. (Capability unit VIIe–2; woodland group 4r2)

Toccoa Series

The Toccoa series consists of nearly level, well-drained, loamy soils that formed in alluvium. This material was washed from adjacent hillsides on flood plains. The soils are along the major streams and depressions throughout this survey area.

Typically, the surface layer is brown fine sandy loam about 6 inches thick. Below this layer is yellowish-brown fine sandy loam about 36 inches thick. The next layer, to a depth of about 54 inches, is dark yellowish-brown gravelly fine sandy loam.

These soils are moderate to low in natural fertility and in organic-matter content and are slightly acid to medium acid. Permeability is moderately rapid, and the available water capacity is medium. Flooding is an occasional hazard for short periods. Tilth is good, and the root zone is deep.

Toccoa soils are suited to a wide range of crops and pasture grasses. They respond well to good management and are among the best soils for farming. Most of the acreage has been cleared and cultivated. Now about three-fourths of the acreage is cultivated or pastured; the rest is forested. The native vegetation is oak, hickory, yellow-poplar, ash, maple, elm, alder, and pine.

Representative profile of Toccoa fine sandy loam:

Ap—0 to 6 inches, brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; few fine mica flakes; slightly acid; clear, wavy boundary.

C1—6 to 42 inches, yellowish-brown (10YR 5/6) fine sandy loam; massive; very friable; stratified; evident bedding planes; many fine roots and mica flakes; medium acid; clear, wavy boundary.

C2—42 to 54 inches +, dark yellowish-brown (10YR 4/4) gravelly fine sandy loam; massive; very friable; evident thin bedding planes; many fine mica flakes; medium acid.

The Ap horizon is brown to dark brown in color and ranges from fine sandy loam or loam to loamy sand in texture. The C horizon ranges from fine sandy loam to loam. It is generally dark brown, yellowish brown, or dark yellowish brown, but in a few areas it is reddish brown. The regolith is loamy, stratified material and ranges from 4 to many feet in thickness. The lower part of the profile has common to many layers of gravel and loamy sand 6 to 18 inches thick or more. The depth to hard rock commonly is more than 10 feet.

Toccoa soils occur mainly with the Chewacla, Cartecay, Wehadkee, and Buncombe soils. They are not so sandy as the Buncombe soils and are browner and better drained than the Chewacla, Cartecay, and Wehadkee soils.

Toccoa complex (Toe).—This mapping unit is about 65 percent Toccoa soils, which are less than 18 percent clay between depths of 10 and 40 inches, and 30 percent similar soils, which are slightly more clayey in the underlying layers. These soils are well drained and medium acid to slightly acid. They occur as narrow strips adjacent to creeks and the major streams. Both soils have thin bedding planes caused by water. Slopes are 0 to 2 percent.

Flooding is not a serious hazard and occurs only for short periods, mostly in winter. Runoff is slow, and the internal drainage is moderately rapid. Tilth is good.

These soils are suited to most locally grown crops, especially corn and pasture grasses. They are used for cultivated crops, mostly corn and pasture (fig. 9). A few areas are in hardwoods. (Capability unit IIw–2; woodland group 1o7)

Tusquitee Series

The Tusquitee series consists of well-drained soils that formed in loamy colluvium weathered from schist, gneiss, and granite. These soils are in narrow coves, on benches, and at the base of slopes, mostly in mountainous areas where the mean annual temperature is less than 59° F. Slopes range from 2 to about 25 percent.

Typically, the surface layer is dark-brown loam in the upper 7 inches and dark yellowish-brown loam in the lower 5 inches. The subsoil is yellowish-brown clay loam and loam that extend to a depth of about 72 inches. Below this are fragments of yellowish-brown and pale-brown weathered gneiss and schist.

These soils are moderate to high in natural fertility, moderate in organic-matter content, and strongly acid. They receive moisture from surrounding uplands. Springs and local seepage areas are common. Permeability is moderately rapid, and the available water capacity is high. The root zone is deep, and tilth is good in most areas.

Most of the acreage has been cleared. The soils on the smoother slopes are used for home gardens, corn, and truck crops. The native vegetation is chiefly dogwood, yellow-poplar, pines, and shrubs.

Representative profile of Tusquitee loam, 10 to 25 percent slopes:

O1—1 inch to 0, partly decomposed hardwood leaves and twigs.

Figure 9.—**An area of Toccoa complex farmed continuously in corn and fescue hay.**

A11—0 to 7 inches, dark-brown (10YR 3/3) loam; weak, fine, granular structure; very friable; many fine and medium roots; fine mica flakes; strongly acid; clear, smooth boundary.

A12—7 to 12 inches, dark yellowish-brown (10YR 4/4) loam; weak, medium, subangular blocky structure; very friable; few fine roots; many fine mica flakes; strongly acid; gradual, wavy boundary.

B2t—12 to 66 inches, yellowish-brown (10YR 5/4) clay loam; weak, medium, subangular blocky structure; friable; few fine roots; few clay films on ped surfaces; many fine mica flakes; strongly acid; gradual, wavy boundary.

B3t—66 to 72 inches, yellowish-brown (10YR 5/8) loam; weak, medium, subangular blocky structure; very friable; few fine roots; few clay films on ped surfaces; many fine mica flakes; common black mica-schist fragments; strongly acid; gradual, wavy boundary.

C—72 to 86 inches +, yellowish-brown (10YR 5/8) and pale-brown (10YR 6/3), weathered, soft gneiss and schist fragments; massive; many fine mica flakes; strongly acid.

The A1 horizon is mostly loam but is silt loam, with or without stones or cobblestones in a few areas. Its color is chiefly dark brown and very dark grayish brown. The B2t horizon ranges from loam to clay loam and is sandy clay loam in a few areas. The color is yellowish brown, dark yellowish brown, strong brown, or dark brown. The solum ranges from 48 inches to 84 inches or more in thickness. The depth to hard rock is generally more than 10 feet.

Tusquitee soils occur mainly with Porters, Ashe, Edneyville, and Talladega soils. They have a thicker solum and fewer coarse fragments than the associated soils.

Tusquitee stony loam, 10 to 25 percent slopes (TmE).—This soil formed in colluvial deposits on foothills and at the base of slopes, in areas of about 10 to 50 acres. The surface layer is dark-brown loam that contains stones, gravel, and a few cobblestones. The subsoil is yellowish-brown and strong-brown loam or clay loam. Large stones make up about 25 to 40 percent of the surface layer and the subsoil. Included in mapping are small areas of soils steeper than 25 percent and small areas of Porters, Edneyville, and Talladega soils.

This Tusquitee soil is not suited to cultivated crops or pasture, mainly because of stoniness. It is well suited to trees. (Capability unit VIIs-1; woodland group 2x8)

Tusquitee loam, 2 to 6 percent slopes (TlB).—This soil formed in small concave draws and at the base of steep slopes, in areas of about 5 to 10 acres. The surface layer is dark-brown loam 6 to 12 inches thick. The subsoil is strong-brown clay loam. Both the surface layer and the subsoil are friable; they contain few pebbles and fragments of cobblestones. The subsoil extends to a depth of 56 inches or more. Included in mapping are small, eroded areas and a few areas where the surface layer is yellowish brown or dark reddish brown.

This soil has good tilth. It is well suited to locally grown crops, especially to truck crops and crops grown in home gardens. (Capability unit IIe-1; woodland group 2o7)

Tusquitee loam, 6 to 10 percent slopes (TlC).—This soil formed in colluvium on mountain slopes and in concave depressions, in areas of about 5 to 20 acres. The surface layer is mostly dark-brown loam 6 to 12 inches thick. The subsoil is mainly strong-brown clay loam that extends to a depth of about 60 inches. Included in mapping are small areas of Porters, Ashe, and Edneyville soils; a few areas where the surface layer and subsoil contain pebbles and cobblestones; and areas where rills and a few shallow gullies have formed and the surface layer is yellowish brown or dark reddish brown.

This Tusquitee soil has good tilth. It is well suited to all locally grown crops and pasture grasses. The erosion hazard is slight to moderate in cultivated areas. (Capability unit IIIe–1; woodland group 2o7)

Tusquitee loam, 10 to 25 percent slopes (TlE).—This soil formed in colluvial deposits on benches and at the base of long hillsides, in areas of about 10 to 50 acres. It has the profile described as representative of the series. Included in mapping are areas where shallow gullies and a few gullies 3 to 5 feet deep have formed, a few areas of soils steeper than 25 percent, and small areas of Porters, Ashe, and Edneyville soils.

This Tusquitee soil is better suited to perennial vegetation or woodland than to cultivated crops. It has good tilth. A few areas are cultivated or used for home gardens, but most of the acreage is in pasture grasses or woodland. (Capability unit VIe–1; woodland group 2r8)

Wehadkee Series

The Wehadkee series consists of poorly drained, nearly level soils. These soils occur as scattered areas along the major streams throughout Cherokee, Gilmer, and Pickens Counties. They formed in recent loamy sediments weathered from mineral rock, such as schist, gneiss, and phyllite.

Typically, the surface layer is grayish-brown loam mottled with yellowish brown. It is about 10 inches thick. The subsoil is loam and sandy clay loam that extends to a depth of about 32 inches. It is dark gray in the upper part and gray mottled with olive yellow in the lower part. Below this, to a depth of about 48 inches, is gray sandy loam mottled with olive brown.

These soils are low in organic-matter content and natural fertility and are medium acid to slightly acid. Permeability is moderate, and the available water capacity is medium. Tilth is poor, and root penetration is inhibited by the high water table. Floods often last for 3 to 5 days.

Long periods of wetness limit the suitability of these soils for crops. The vegetation is chiefly willow, alder, sweetgum, elm, yellow-poplar, white oak, and water oak. Some areas have been drained and pastured, but most of the acreage is in water-tolerant hardwoods and grasses.

Representative profile of Wehadkee loam:

A—0 to 10 inches, grayish-brown (2.5YR 5/2) loam; common, fine, faint mottles of yellowish brown (10YR 5/6); weak, medium and coarse, granular structure; friable to slightly sticky; many fine mica flakes and fine roots; slightly acid; clear, smooth boundary.

B1g—10 to 19 inches, dark-gray (5Y 4/1) loam; weak, coarse, subangular blocky structure; slightly sticky; many fine mica flakes; medium acid; gradual, wavy boundary.

B2g—19 to 32 inches, gray (5Y 6/1) sandy clay loam; few, fine, distinct mottles of olive yellow (2.5Y 6/6); weak, medium, subangular blocky structure; sticky to very sticky; many fine mica flakes; medium acid; diffuse, wavy boundary.

Cg—32 to 48 inches +, gray (5Y 5/1) sandy loam; few, fine, distinct mottles of light olive brown (2.5Y 4/4); massive; friable; many fine mica flakes and few quartz grains and pebbles; water table present; medium acid.

The A horizon ranges from dark grayish brown to grayish brown mottled with olive gray and yellowish brown. Its texture is mostly loam or sandy loam but is silty clay loam in some areas. The B horizon ranges from dark gray to gray mottled with grayish brown and olive yellow. Its texture is loam to sandy clay loam. Thickness of the solum ranges from 32 to 50 inches. Commonly, layers of coarse sand, small pebbles and rock fragments are at variable depths in the Cg horizon. Fine mica flakes are common to many throughout.

The Wehadkee soils occur mostly with Chewacla and Cartecay soils and to limited extent with Augusta and Worsham soils. They are grayer and wetter than Chewacla, Augusta, and Cartecay soils. They are not so well developed as Worsham soils and are less clayey in the B horizon than those soils.

Wehadkee loam (Wht).—This is a wet soil on first bottoms. Slopes are 0 to about 2 percent. Included in mapping are soils that have mixed layers of sand, pebbles, and gravel deposits about 3 to 12 inches thick, and small areas of Worsham, Chewacla, and Cartecay soils.

This Wehadkee soil is suited mainly to water-tolerant plants. If adequately drained and protected from flooding, it is suited to pasture plants and selected crops. Tilth is poor because of slow runoff and ponding. Nearly all the acreage is in grass, alders, and water-tolerant hardwoods. (Capability unit IVw–1; woodland group 1w9)

Wickham Series

The Wickham series consists of well-drained soils that formed in material weathered from gneiss, schist, and slate. These soils are on long, narrow terraces along the larger streams and at the base of concave slopes of the foothills. Slopes range from 2 to 25 percent.

Typically, the surface layer is dark yellowish-brown fine sandy loam about 7 inches thick. The subsoil is yellowish-red and reddish-yellow sandy clay loam and clay loam. It extends to a depth of about 66 inches. Below the subsoil, to a depth of 72 inches, is reddish-yellow gravelly sandy material (fig. 10).

Figure 10.—**Profile of a Wickham soil showing layer of gravel at a depth of 6 feet. Soil is on an old colluvial terrace.**

These soils are low in natural fertility and organic-matter content and are strongly acid to very strongly acid. Permeability is moderate, and the available water capacity is medium. Tilth is good, and the root zone is deep.

These soils are suited to a wide range of crops. The response to management is good, especially to fertilization. The original vegetation was hardwoods and pines. Most of the acreage has been cultivated, but now about half of it is cultivated or pastured; the rest is wooded.

Representative profile of Wickham fine sandy loam, 6 to 10 percent slopes, eroded:

Ap—0 to 7 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; abrupt, smooth boundary.

B1t—7 to 12 inches, yellowish-red (5YR 5/8) sandy clay loam; weak, fine, subangular blocky structure; friable; common fine roots; few rounded quartz pebbles; strongly acid; abrupt, wavy boundary.

B2t—12 to 46 inches, yellowish-red (5YR 5/8) clay loam; moderate, medium, subangular blocky structure; firm; clay films on ped surfaces; few fine roots; few rounded quartz pebbles; strongly acid; gradual, wavy boundary.

B3t—46 to 66 inches, reddish-yellow (5YR 6/8) sandy clay loam; weak, fine, subangular blocky structure; friable; few clay films on ped surfaces; common rounded quartz pebbles; strongly acid; gradual, wavy boundary.

C—66 to 72 inches +, reddish-yellow (5YR 6/8) gravelly sandy material; many rounded quartz pebbles; massive; very strongly acid.

The Ap horizon is ordinarily fine sandy loam or loam. In severely eroded areas it is sandy loam, silt loam, or sandy clay loam. It ranges in color from dark yellowish brown and dark brown to yellowish red. The B2t horizon ranges from sandy clay loam to clay loam in texture and from yellowish red to red in color. Thickness of the solum ranges from 40 to 66 inches. The depth to hard rock ranges from 6 to more than 10 feet. There are none to many pebbles on the surface and throughout the profile.

Wickham soils occur mainly with Hiwassee and Masada soils. Their A and B horizons are less red and less clayey throughout than those of Hiwassee soils. Their B horizon is redder than that of Masada soils.

Wickham fine sandy loam, 2 to 6 percent slopes (WgB).—This soil is on smooth upland terraces. Areas are about 5 to 20 acres in size. The surface layer is dark brown to dark yellowish brown and is 4 to 8 inches thick. The subsoil is yellowish-red sandy clay loam to clay loam and extends to a depth of about 62 inches. Included in mapping are a few shallow gullies and rills, small areas of Hiwassee and Masada soils, and a few areas of soils that have a gravelly substratum at a depth of 40 to 60 inches.

This Wickham soil is suited to moderately intensive use for locally grown crops. Tilth is good except in the eroded areas. Most of the acreage has been cultivated. The response to management, especially to fertilization, is good. The erosion hazard is slight to moderate. Most of the acreage is cultivated or pastured; a few areas are wooded. (Capability unit IIe–1; woodland group 3o7)

Wickham fine sandy loam, 6 to 10 percent slopes, eroded (WgC2).—This soil is on small terraces and on the base slopes of hillsides. It has the profile described as representative for the Wickham series. Areas are about 10 to 25 acres in size. In most areas, the combined thickness of the surface layer and the subsoil ranges from 50 to 66 inches. In most places the plow layer has been mixed with material from the subsoil. Included in mapping are small areas of Hiwassee and Masada soils and a few severely eroded spots in which the surface layer is yellowish-red sandy clay loam.

This soil is suited to locally grown crops. In cultivated areas, surface runoff is medium to rapid and the erosion hazard is moderate to severe. The response to management, especially to fertilization, is good. About half the acreage is woodland; the rest is in crops or pasture. (Capability unit IIIe–1; woodland group 3o7)

Wickham fine sandy loam, 10 to 25 percent slopes, eroded (WgE2).—This soil formed on high stream terraces and in old local alluvium on base slopes and foothills. Areas are 5 to 25 acres in size. The surface layer is dark-brown fine sandy loam 6 to 12 inches thick. The subsoil is red clay loam or sandy clay loam. There are a few shallow gullies and a few deep gullies, mainly in old trails, pathways, and roadways. In a few cultivated areas, erosion has removed most of the original surface layer and the plow layer is yellowish-red sandy clay loam. Included in mapping are a few areas of similar soils that are clayey in the upper 20 inches of the subsoil, small areas of Tusquitee soils, and some cobbly and stony soils, mainly in the irregular coves of mountainous areas.

This soil is suited to pasture plants and legumes, but good management is needed to control erosion. The soil is better suited to perennial pasture, hay crops, and trees. In cultivated areas the erosion hazard is severe to very severe. Most of the acreage is woodland. (Capability unit VIe–2; woodland group 3r8)

Wickham sandy clay loam, 2 to 10 percent slopes, severely eroded (WnC3).—This soil is on fairly broad stream terraces. Areas are about 10 to 25 acres in size. Erosion has removed most of the original surface layer and in places, part of the subsoil. The present surface layer is yellowish-red sandy clay loam 4 to 6 inches thick. It is a mixture of material from the original surface layer and the upper part of the subsoil. The subsoil is red clay loam and sandy clay loam to a depth of about 50 inches. In most areas there are shallow gullies, and in old roadways and trails, a few deep gullies. Included in mapping are small areas of Hiwassee soils.

Surface runoff is moderately rapid, and further erosion is a severe hazard in cultivated areas or in areas left bare. Because of the high content of clay in the surface layer, tilth is generally poor.

This soil is suited to permanent pasture, hay crops, and pine trees. If well managed, it can be cultivated occasionally. Most of the acreage has been cultivated, but is now used for pasture or woodland. (Capability unit IVe–1; woodland group 4c2)

Wickham sandy clay loam, 10 to 25 percent slopes, severely eroded (WnE3).—This soil is on high stream terraces and foothills. Areas are about 10 to 25 acres in size. The plow layer is yellowish-red sandy clay loam. It is a mixture of material from the upper part of the subsoil and the remaining part of the original surface layer. The subsoil is red clay loam. The combined thickness of the surface layer and the subsoil is about 40 to 50 inches. In most areas shallow rills, gullies, and a few deep gullies have formed. Included in mapping are a few areas of Hiwassee soils.

This Wickham soil is suited to permanent pasture or pine trees. Slow infiltration and steep slopes make runoff rapid and the hazard of further erosion severe. Most of the acreage is forest or pasture, but a few areas are cultivated. (Capability unit VIIe-1; woodland group 4c2)

Wilkes Series

The Wilkes series consists of well-drained soils on narrow upland ridgetops and short side slopes. These soils formed in material that weathered from a mixture of gneiss, granite, diorite, gabbro, and hornblende. Slopes range from 5 to 15 percent.

Typically, the surface layer is olive-brown cobbly loam about 5 inches thick. The subsoil is clay loam and gravelly clay that extend to a depth of about 19 inches. It is brownish yellow in the uppermost part, yellowish brown mottled with light yellowish brown and yellowish red in the middle part, and yellowish brown mottled with olive yellow and yellowish red in the lowermost part. Below this, to a depth of 52 inches, is weathered green, gray, and black schist, diorite, and granite.

These soils are low in natural fertility and organic-matter content and are medium acid below the surface layer. Permeability is moderately slow, and the available water capacity is low. The root zone is shallow, and tilth is poor.

Although most of the acreage on the smoother slopes has been cultivated, these soils generally are not suited to farming. They are better suited to woodland and pasture. The native vegetation was mainly mixed oaks, hickory, redcedar, and pines.

Representative profile of Wilkes cobbly loam, 5 to 15 percent slopes:

Ap—0 to 5 inches, olive-brown (2.5Y 5/4) cobbly loam; weak, fine, granular structure; very friable; many fine roots; about 15 percent of surface covered with cobblestones; strongly acid; clear, wavy boundary.

B21t—5 to 10 inches, brownish-yellow (10YR 6/6) clay loam; many, fine, distinct mottles of strong brown (7.5YR 5/8); moderate, medium, angular blocky structure; very firm; about 20 percent weathered, coarse quartz fragments; few mica flakes; medium acid; gradual, wavy boundary.

B22t—10 to 16 inches, yellowish-brown (10YR 5/8) clay loam; many, medium, prominent mottles of light yellowish brown (2.5Y 6/4) and yellowish red (5YR 5/8); moderate, medium, angular and subangular blocky structure; very firm; about 10 percent weathered, soft, coarse rock fragments; medium acid; clear, wavy boundary.

B3t—16 to 19 inches, yellowish-brown (10YR 5/6) gravelly clay; many, medium, distinct mottles of olive yellow (5Y 6/8) and yellowish red (5YR 5/8); weak, medium, subangular blocky structure; firm; about 50 percent weathered rocks with clay accumulated between fragments; slightly acid; clear, wavy boundary.

C—19 to 52 inches +, mixed shades of green, gray, and black, partly weathered hornblende schist, granite, and diorite.

The Ap horizon is chiefly cobbly loam or sandy loam, but in some places it is stony. The color is olive brown, brown, or grayish brown. The A1 horizon, where present, is similar in texture to the Ap horizon but has colors of dark grayish brown. The B2t horizon ranges from yellowish brown to light olive brown mottled with light yellowish brown, olive yellow, and yellowish red. In some profiles the Bt horizon is clay about 4 inches thick. Thickness of the solum is generally about 18 or 19 inches but ranges from 8 inches to about 19 inches. Cobbly and stony fragments are few to many in most horizons. The depth to hard rock is 2 to about 5 feet.

Wilkes soils occur mostly among Musella and Helena soils and in a few places with Hayesville soils. They lack the dark reddish-brown A horizon and the dark-red B horizon of Musella soils. They are similar in color to Helena soils but have a thinner, less clayey B horizon than those soils. They are browner and shallower than Hayesville soils.

Wilkes complex, 5 to 15 percent slopes (WpD).—This complex consists of cobbly and stony Wilkes soils and soils that have a clayey subsoil. It occurs on fairly smooth ridgetops, hillsides, and sharp escarpments. Areas are about 10 to 25 acres in size. Wilkes soils have the profile described as representative for the series. The thickness of the surface layer and the subsoil is about 19 inches in most places. In places, however, there is very little subsoil and the soil is very shallow over rock. Included in mapping are a few shallow gullies and a few deep gullies; areas of boulders, especially on steep slopes; a few small areas having slopes less than 5 percent and a few having slopes greater than 15 percent; and small areas of Helena soils.

These soils have poor tilth, rapid runoff, and a shallow root zone. They are not suited to cultivated crops because of steep slopes, coarse fragments, and the severe erosion hazard. They are better suited to grasses and woodland than to other crops. (Capability unit VIe-3; woodland group 4o1)

Worsham Series

The Worsham series consists of poorly drained soils that formed in mixed clayey sediments weathered from schist, gneiss, or phyllite. These soils are on low stream terraces, around the heads of drainageways, in depressions, and at the base of slopes in the lower part of uplands. The areas are fairly large along the low terraces but are small around the heads of drainageways and in depressions. Slopes are 0 to about 2 percent.

Typically, the surface layer is dark grayish-brown fine sandy loam about 5 inches thick. The subsoil, to a depth of about 52 inches, is sandy clay loam and sandy clay. It is light gray in the uppermost part, gray mottled with light olive brown and strong brown in the middle part, and mottled gray and pale olive in the lowermost part.

Worsham soils are low in natural fertility and content of organic matter and are strongly acid to very strongly acid. The available water capacity is medium to high. Permeability is moderately slow to very slow. Tilth is poor because of wetness.

These soils are poorly suited to cultivated crops. They are flooded frequently, and the clayey layer and high water table inhibit root penetration and restrict the suitability of crops. The vegetation is chiefly willow, water oak, white oak, sycamore, sweetgum, yellow-poplar, and pine.

Representative profile of Worsham fine sandy loam:

Ap—0 to 5 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear, smooth boundary.

B21t—5 to 11 inches, light-gray (10YR 7/2) sandy clay loam; many, medium, distinct, strong-brown (7.5YR 5/6) mottles; weak, medium, subangular blocky structure; friable; many fine roots; strongly acid; clear, wavy boundary.

B22t—11 to 32 inches, gray (2.5Y 5/1) sandy clay; many, medium, coarse, distinct mottles of light olive brown (2.5Y 5/4) and strong brown (7.5YR 5/8); moderate, coarse, subangular blocky structure; very firm; clay films on ped surfaces; common fine roots; strongly acid; gradual, wavy boundary.

B23tg—32 to 52 inches +, mottled gray (5Y 5/1) and pale-olive (5Y 6/4) sandy clay loam; colors are about equal in dominance; moderate, medium, subangular blocky structure; firm; common black to purplish blue concretions and a few quartz fragments; strongly acid.

The A horizon ranges from gray to dark grayish brown in color. The B22t horizon is gray or light brownish gray mottled with strong brown, light olive brown, or yellowish brown in color and is sandy clay, clay, or clay loam in texture. The solum ranges from 42 to about 55 inches in thickness. There are a few pebbles in some profiles.

Worsham soils occur mainly with Augusta, Chewacla, Wehadkee, and Buncombe soils. They are more poorly drained and are grayer than Augusta, Chewacla, and Buncombe soils. They resemble Wehadkee soils in drainage and color but have a more clayey Bt horizon.

Worsham fine sandy loam (Wks).—This poorly drained, nearly level soil is generally on the outer edges of large flood plains. Areas are 5 to 25 acres in size. Slopes are 0 to about 2 percent. Included in mapping are areas of Wehadkee and Augusta soils, and a few small areas around the heads of drainageways that have 2 to 6 percent slopes.

This Worsham soil is suited to only a few crops. It is better suited to permanent pasture and woodland. In cultivated areas, extensive drainage is needed to remove excess water and improve internal soil drainage. The hazards of flooding and a high water table are moderate to severe (Capability unit Vw-1; woodland group 2w8)

Town and Country Planning

This section was prepared chiefly for planners, developers, landscape architects, builders, zoning officials, realtors, private and potential landowners, and others interested in the use of the soils in the survey area. Because of the steady expansion of industries in nearby Marietta (in Cobb County) and Cartersville (in Bartow County), this survey area is undergoing tremendous change. Allatoona Lake and Carters Lake have caused vast changes in land use. The two reservoirs and the mountainous parts of the area have made abundant opportunities for use of recreational facilities (*14*). As the population increases, the demand for housing, shopping centers, parks, golf courses, and other urban developments increases.

The suitability of soils in each site must be considered in selecting a site for a home, a highway, an industry, or other nonfarm use. The more common properties affecting use of the soils for such purposes are soil texture, reaction, shrink-swell potential, slope, permeability, depth to hard rock and to the water table, and hazard of flooding. The degree and kind of limitation of soils for specific nonfarm uses are shown in table 2.

The limitations of the soils are rated *slight*, *moderate*, and *severe*. *Slight* indicates that soil properties are favorable; no limitation is listed. *Moderate* indicates that some adjustments are needed, but the limitations can be overcome by planning. *Severe* indicates that extensive adjustments are needed before the soil is suitable and that the limitations are difficult to overcome.

Flooding is a limitation for most nonfarm uses. *Very frequent* means the hazard of flooding is more often than once every year; *frequent*, once in 1 to 5 years; and *infrequent*, less than once in 5 to 20 years. *Extremely brief* floods last less than 2 days; *very brief* floods, 2 to 7 days; *brief* floods, from 7 days to 1 month; and *long* floods, from 1 to 6 months.

Table 2 also gives the suitability of the soil as a source of topsoil. The ratings are *good*, *fair*, and *poor*.

Each of the nonfarm uses of the soils mentioned in table 2 is defined in the paragraphs that follow. The properties important in rating the limitations of soils for such uses are also given. An investigation should be made at the site before beginning most construction projects.

Building sites for residences.—These areas are used as homesites. The ratings and limitations are for houses not more than three stories high. The properties most important are bearing capacity, shrink-swell potential, wetness, flooding, slopes, stoniness, rockiness, and shallowness over rock. The kind of sewage system is not considered in the evaluation for residences.

Building sites for light industries.—These structures are used for stores, offices, and small industries not more than three stories high. The soil properties affecting the limitations of the soils are slope, flooding, wetness, depth to hard rock, bearing capacity, stoniness, rockiness, corrosivity of steel, and shrink-swell potential. Sewage disposal facilities are assumed to be available and are not considered. The shrink-swell potential is more restrictive for light industries than for residences.

Septic tank filter fields.—A septic tank filter field is a sewage system in which waste is collected in a central tank, and the effluent from the tank is dispersed over a fairly large area by absorptive field lines buried in the soil (*13*). The properties considered are depth to the seasonal high water table and to hard rock, flooding, slope, and rate of percolation.

Sewage lagoons.—A sewage lagoon (*4*) consists of an impounded area and a dike. Soils used as a floor for the basin of a lagoon need effective sealing against seepage, an even, fairly level surface, and little or no content of organic matter. The soil properties considered are permeability, suitability of the material at the site for a dike, depth to hard rock, slope, content of organic matter, and content of coarse fragments more than 6 inches in diameter. Generally, a sewage lagoon is planned so that not less than 2 feet and no more than 5 feet of liquid is within the lagoon.

Sanitary land fills.—A sanitary land fill is an area used for disposal of household trash and garbage. Such material is buried in the soil. The most important properties in constructing and operating this system are slope, soil texture, depth to hard rock and to the water table, and the hazard of flooding.

Cemetery sites.—Cemetery sites range from about half an acre to more than 10 acres in size. Small sites are near country churches, but large memorial parks and other cemeteries are likely to be centrally located. The properties considered are slope, texture, stoniness, depth to hard rock and to the water table, and the hazard of flooding.

Picnic areas.—These areas are suitable for pleasure outings at which a meal is eaten outdoors. Such facilities as tables and fireplaces generally are furnished. Because the areas are subject to heavy foot traffic, the chief requirement is good trafficability. Little site preparation is needed.

417-141—73——3

TABLE 2.—*Degree and kind of limitation*

Soil series and map symbols	Residences	Light industries	Septic tank filter fields	Sewage lagoons	Sanitary land fills	Cemeteries
Alluvial land: Ajc	Severe: frequent, extremely brief flooding.	Severe: frequent, extremely brief flooding.	Severe: frequent, extremely brief flooding.	Severe: frequent, extremely brief flooding.	Severe: frequent, extremely brief flooding.	Severe: frequent, extremely brief flooding.
Appling:						
AmB2	Slight	Moderate: moderate shrink-swell potential.	Moderate: moderate to slow percolation.	Moderate: slope.	Slight	Slight
AmC2	Slight	Moderate: moderate shrink-swell potential; slope.	Moderate: moderate to slow percolation.	Severe: slope	Slight	Slight
AmD2	Moderate: slope.	Severe: slope	Moderate: slope.	Severe: slope	Moderate: slope.	Moderate: slope.
Ashe:						
AcG	Severe: shallowness over hard rock; slope.	Severe: slope; rocks.	Severe: slope; rocks.	Severe: seepage; slope.	Severe: rocks; slope.	Severe: rocks; slope.
AEE, AEF	Severe: hard rock at a depth of 2 to 5 feet; slope.	Severe: slope; rocks.	Severe: slope	Severe: slope	Severe: hard rock at a depth of 2 to 5 feet; slope.	Severe: slope
Augusta: Afs	Severe: very frequent, brief flooding; seasonal high water table.	Severe: very frequent, brief flooding; seasonal high water table.	Severe: very frequent, brief flooding; seasonal high water table.	Severe: [1] very frequent, brief flooding.	Severe: very frequent, brief flooding: seasonal high water table.	Severe: very frequent, brief flooding; seasonal high water table.
Buncombe: Bfs	Severe: frequent, extremely brief flooding.	Severe: frequent, extremely brief flooding.	Severe: frequent, extremely brief flooding.	Severe: rapid permeability.	Severe: frequent, extremely brief flooding.	Moderate: frequent, extremely brief flooding.
Chewacla: Chc	Severe: Very frequent, brief flooding; seasonal high water table.	Severe: Very frequent, brief flooding; seasonal high water table.	Severe: Very frequent, brief flooding; seasonal high water table.	Severe: [1] Very frequent, brief flooding.	Severe: Very frequent, brief flooding; seasonal high water table.	Severe: Very frequent, brief flooding; seasonal high water table.
Dekalb:						
DtD	Moderate: stones and rocks.	Severe: slope	Severe: stones and rocks.	Severe: seepage; slope.	Severe: stones and rocks.	Severe: stones and rocks; slope.
DuE, DuF	Severe: stones and rocks; slope.	Severe: slope	Severe: slope	Severe: seepage; slope.	Severe: stones and rocks; slope.	Severe: stones and rocks; slope.

See footnote at end of table.

of soils for town and country planning

Picnic areas	Campsites	Playgrounds	Golf fairways	Paths and trails	Trafficways	Suitability as source of topsoil
Severe: frequent, extremely brief flooding.	Severe: frequent, extremely brief flooding.	Severe: frequent, extremely brief flooding.	Severe: frequent, extremely brief flooding.	Moderate: frequent, extremely brief flooding.	Severe: frequent, extremely brief flooding.	Good to fair: gravelly and cobbly material.
Slight	Slight	Moderate: slope.	Slight	Slight	Moderate: moderate traffic-supporting capacity.	Fair.
Slight	Moderate: slope.	Severe: slope	Moderate: slope.	Slight	Moderate: moderate traffic-supporting capacity.	Fair.
Moderate: slope.	Moderate: slope.	Severe: slope	Moderate: slope.	Slight	Moderate: slope; moderate traffic-supporting capacity.	Fair.
Severe: poor trafficability; slope.	Severe: rocks; slope.	Severe: rocks; slope.	Severe: rocks; slope.	Severe: slope; rocks.	Severe: rocks; slope.	Good unless stony.
Severe: stones on surface; slope.	Severe: stones on surface; slope.	Severe: slope	Severe: slope	Moderate to severe: slope.	Severe: slope	Good unless stony.
Moderate: very frequent, brief flooding; seasonal high water table.	Severe: very frequent, brief flooding; seasonal high water table.	Severe: very frequent, brief flooding.	Severe: very frequent, brief flooding; seasonal high water table.	Moderate: very frequent, brief flooding; seasonal high water table.	Moderate to severe: very frequent, brief flooding; seasonal high water table.	Poor.
Moderate: frequent, extremely brief flooding.	Moderate to severe: frequent, extremely brief flooding.	Severe: frequent, extremely brief flooding.	Moderate: frequent, extremely brief flooding.	Slight	Severe: frequent, extremely brief flooding.	Poor.
Moderate: very frequent, brief flooding; seasonal high water table.	Severe: very frequent, brief flooding; seasonal high water table.	Severe: very frequent, brief flooding.	Severe: very frequent, brief flooding; seasonal high water table.	Moderate: very frequent, brief flooding; seasonal high water table.	Severe: very frequent, brief flooding; seasonal high water table.	Good.
Moderate: slope; stones and rocks.	Severe: stones and rocks.	Severe: slope	Moderate: slope; coarse fragments.	Slight to moderate: stones and rocks.	Moderate: stones and rocks; slope.	Fair.
Severe: stones and rocks; slope.	Severe: stones and rocks.	Severe: slope	Severe: slope; coarse fragments.	Severe: slope; stones and rocks.	Severe: stones and rocks; slope.	Poor.

TABLE 2.—*Degree and kind of limitation*

Soil series and map symbols	Residences	Light industries	Septic tank filter fields	Sewage lagoons	Sanitary land fills	Cemeteries
Grover:						
GiB	Slight	Moderate: moderate shrink-swell potential.	Moderate: moderate to slow percolation.	Moderate: slope.	Slight	Slight
GiC2	Slight	Moderate: moderate shrink-swell potential; slope.	Moderate: moderate to slow percolation.	Severe: slope	Slight	Slight
GiD	Moderate: slope.	Severe: slope	Moderate: slope.	Severe: slope	Moderate: slope.	Moderate: slope.
Gwinnett:						
GdB2	Slight	Moderate: moderate shrink-swell potential.	Moderate: moderate to slow percolation.	Moderate: slope.	Slight	Slight
GdD3	Slight to moderate: slope.	Severe: slope	Moderate: moderate to slow percolation.	Severe: slope	Moderate: slope.	Moderate: slope.
GdE3	Moderate to severe: slope.	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
GgB2	Slight	Moderate: moderate shrink-swell potential.	Moderate: moderate to slow percolation.	Moderate: slope.	Slight	Slight
GgC2	Slight	Moderate: moderate shrink-swell potential; slope.	Moderate: moderate to slow percolation.	Severe: slope	Slight	Slight
GgE2	Moderate to severe: slope.	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Hayesville:						
HIB	Slight	Moderate: moderate shrink-swell potential.	Moderate: moderate to slow percolation.	Moderate: slope.	Slight	Slight
HIC	Slight	Moderate: moderate shrink-swell potential; slope.	Moderate: moderate to slow percolation.	Severe: slope	Slight	Slight
HIE, HJE3	Moderate to severe: slope.	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
HJC3	Slight	Moderate: slope; moderate shrink-swell potential.	Moderate: moderate to slow percolation.	Severe: slope	Slight	Moderate: surface layer of sandy clay loam.

See footnote at end of table.

of soils for town and country planning—Continued

Picnic areas	Campsites	Playgrounds	Golf fairways	Paths and trails	Trafficways	Suitability as source of topsoil
Slight	Slight	Moderate: slope.	Slight	Slight	Moderate: moderate traffic-supporting capacity.	Fair.
Slight	Moderate: slope.	Severe: slope	Moderate: slope.	Slight	Moderate: moderate traffic-supporting capacity.	Fair.
Moderate: slope.	Moderate: slope.	Severe: slope	Moderate: slope.	Slight	Moderate: slope; moderate traffic-supporting capacity.	Fair.
Moderate: surface layer of sandy clay loam.	Moderate: surface layer of sandy clay loam.	Moderate: slope.	Slight to moderate: surface layer of sandy clay loam.	Moderate: surface layer of sandy clay loam.	Moderate: moderate traffic-supporting capacity.	Poor.
Moderate: surface layer of sandy clay loam.	Moderate: surface layer of sandy clay loam.	Severe: slope	Moderate: slope; surface layer of sandy clay loam.	Moderate: surface layer of sandy clay loam.	Moderate: moderate traffic-supporting capacity.	Poor.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Moderate: surface layer of sandy clay loam.	Moderate: moderate traffic-supporting capacity; slope.	Poor.
Slight	Slight	Moderate: slope.	Slight	Slight	Moderate: moderate traffic-supporting capacity.	Fair.
Slight	Moderate: slope.	Severe: slope	Moderate: slope.	Slight	Moderate: moderate traffic-supporting capacity.	Fair.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.	Moderate: moderate traffic-supporting capacity; slope.	Fair.
Slight	Slight	Moderate: slope.	Slight	Slight	Moderate: moderate traffic-supporting capacity.	Fair.
Slight	Moderate: slope.	Severe: slope	Moderate: slope.	Slight	Moderate: moderate traffic-supporting capacity.	Fair.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.	Moderate: slope; moderate traffic-supporting capacity.	Fair.
Moderate: surface layer of sandy clay loam.	Moderate: surface layer of sandy clay loam.	Moderate to severe: slope.	Moderate: slope.	Moderate: surface layer of sandy clay loam.	Moderate: moderate traffic-supporting capacity.	Poor.

TABLE 2.—*Degree and kind of limitation*

Soil series and map symbols	Residences	Light industries	Septic tank filter fields	Sewage lagoons	Sanitary land fills	Cemeteries
Helena: HYC	Severe: moderate to high shrink-swell potential.	Severe: moderate to high shrink-swell potential.	Severe: slow percolation.	Moderate: slope.	Moderate: moderately good drainage.	Moderate: moderately good drainage.
Hiwassee:						
HSB	Slight	Moderate: moderate shrink-swell potential.	Moderate: moderate percolation.	Moderate: slope.	Slight	Slight
HSC	Slight	Moderate: moderate shrink-swell potential; slope.	Moderate: moderate percolation.	Severe: slope	Slight	Slight
HTD3	Slight to moderate: slope.	Severe: slope	Moderate: slope.	Severe: slope	Moderate: slope.	Moderate: slope.
Madison:						
MiC2	Slight	Moderate: moderate shrink-swell potential; slope.	Moderate: moderate to slow percolation.	Severe: slope	Slight	Slight
MjB	Slight	Moderate: moderate shrink-swell potential.	Moderate: moderate to slow percolation.	Moderate: slope.	Slight	Slight
MjC	Slight	Moderate: moderate shrink-swell potential.	Moderate: moderate to slow percolation.	Severe: slope	Slight	Slight
MjD	Moderate: slope.	Severe: slope	Moderate: moderate to slow percolation; slope.	Severe: slope	Moderate: slope.	Moderate: slope.
Masada:						
MoC2, MpC	Slight	Moderate: slope.	Slight	Severe: slope	Slight	Slight
MoA	Moderate to severe: frequent, extremely brief flooding.	Moderate to severe: frequent, extremely brief flooding.	Moderate to severe: frequent, extremely brief flooding.	Moderate: frequent, extremely brief flooding.	Moderate to severe: frequent, extremely brief flooding.	Moderate to severe: frequent, extremely brief flooding.
MoB	Slight	Slight	Slight	Moderate: slope.	Slight	Slight
MyD2	Slight to moderate: slope.	Severe: slope	Moderate: moderate percolation.	Severe: slope	Moderate: slope.	Moderate: slope.
Musella: MCE	Severe: rock at a depth of about 24 inches; slope.	Severe: rock at a depth of about 24 inches; slope.	Severe: rock at a depth of about 24 inches.	Severe: seepage; slope.	Severe: rock at a depth of about 24 inches; slope.	Severe: cobblestones on the surface.

See footnote at end of table.

of soils for town and country planning—Continued

Picnic areas	Campsites	Playgrounds	Golf fairways	Paths and trails	Trafficways	Suitability as source of topsoil
Moderate: moderately good drainage.	Moderate: moderately good drainage.	Moderate: slope.	Moderate: moderately good drainage.	Slight	Severe: moderate to high shrink-swell potential.	Poor.
Slight	Slight: slope	Moderate: slope.	Slight	Slight	Moderate: moderate traffic-supporting capacity.	Fair.
Slight	Moderate: slope.	Severe: slope	Moderate: slope.	Slight	Moderate: moderate traffic-supporting capacity.	Fair.
Moderate: clay loam surface layer.	Moderate: clay loam surface layer.	Moderate: slope.	Moderate: slope; clay loam surface layer.	Moderate: clay loam surface layer.	Moderate: moderate traffic-supporting capacity.	Poor.
Moderate: surface layer of gravelly sandy clay loam.	Moderate: surface layer of gravelly sandy clay loam.	Moderate: slope.	Moderate slope.	Moderate: surface layer of gravelly sandy clay loam.	Moderate: moderate traffic-supporting capacity.	Poor.
Slight	Slight	Moderate: slope.	Slight	Slight	Moderate: moderate traffic-supporting capacity.	Fair.
Slight	Moderate: slope.	Severe: slope	Moderate: slope.	Slight	Moderate: moderate traffic-supporting capacity.	Fair.
Moderate: slope.	Moderate: slope.	Severe: slope	Moderate slope.	Slight	Moderate: slope; moderate traffic-supporting capacity.	Poor.
Slight	Slight	Moderate: slope.	Moderate: slope.	Slight	Slight	Fair.
Moderate: frequent, extremely brief flooding.	Moderate: frequent, extremely brief flooding.	Moderate to severe: frequent, extremely brief flooding.	Moderate: frequent, extremely brief flooding.	Moderate: frequent, extremely brief flooding.	Moderate: moderate traffic-supporting capacity.	Fair.
Slight	Slight	Moderate: slope.	Slight	Slight	Slight	Fair.
Moderate: surface layer of sandy clay loam.	Moderate: surface layer of sandy clay loam.	Severe: slope	Moderate: slope; surface layer of sandy clay loam.	Moderate: surface layer of sandy clay loam.	Moderate: slope.	Poor.
Moderate to severe: cobblestones on the surface.	Severe: cobblestones on the surface.	Severe: slope	Severe: cobblestones on the surface.	Moderate to severe: cobblestones on the surface.	Moderate to severe: rock at a depth of about 24 inches.	Poor.

TABLE 2.—*Degree and kind of limitation*

Soil series and map symbols	Residences	Light industries	Septic tank filter fields	Sewage lagoons	Sanitary land fills	Cemeteries
Porters: PcD	Severe: hard rock at a depth of 4 to 6 feet.	Severe: hard rock at a depth of 4 to 6 feet; slope.	Severe: hard rock at a depth of 4 to 6 feet.	Severe: slope	Severe: hard rock at a depth of 4 to 6 feet.	Severe: hard rock at a depth of 4 to 6 feet.
Rock land: Roc	Severe: rock	Severe: rock	Severe: rock	Severe: rock	Severe: rock	Severe: rock
Starr: Sta	Severe: frequent, extremely brief flooding.	Severe: frequent, extremely brief flooding.	Severe: frequent, extremely brief flooding.	Severe:[1] frequent, extremely brief flooding.	Severe: frequent, extremely brief, flooding.	Severe: frequent, extremely brief flooding.
Talladega:						
TeG, TRF	Severe: hard rock at a depth of 3 to 5 feet; slope.	Severe: hard rock at a depth of 3 to 5 feet; slope.	Severe: hard rock at a depth of 3 to 5 feet; slope.	Severe: slope	Severe: hard rock at a depth of 3 to 5 feet; slope.	Severe: hard rock at a depth of 3 to 5 feet; slope.
TRE	Severe: hard rock at a depth of 3 to 5 feet; slope.	Severe: hard rock at a depth of 3 to 5 feet; slope.	Severe: hard rock at a depth of 3 to 5 feet; slope.	Severe: hard rock at a depth of 3 to 5 feet; slope.	Severe: hard rock at a depth of 3 to 5 feet; slope.	Severe: hard rock at a depth of 3 to 5 feet; slope.
Tallapoosa:						
TbE, TcE, ThE2	Moderate to severe: slope.	Severe: slope	Severe: slope	Severe: seepage; slope.	Severe: slope	Severe: slope
TbF, TjF	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
TcD	Moderate: slope.	Severe: slope	Severe: rock at a depth of about 18 inches.	Severe: slope	Moderate: rock at a depth of about 18 inches.	Moderate: slope.
Toccoa: Toe	Severe: frequent, brief flooding.	Severe: frequent, brief flooding.	Severe: frequent, brief flooding.	Severe:[1] frequent, brief flooding.	Severe: frequent, brief flooding.	Severe: frequent, brief flooding.
Tusquitee:						
TlB	Slight	Moderate: moderate shrink-swell potential.	Slight	Moderate: slope.	Slight	Slight
TlC	Slight	Moderate: moderate shrink-swell potential.	Slight	Severe: slope	Slight	Slight
TlE	Moderate to severe: slope.	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
TmE	Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: stoniness; slope.
Wehadkee loam: Wht.	Severe: very frequent, brief flooding; seasonal high water table.	Severe: very frequent, brief flooding; seasonal high water table.	Severe: very frequent, brief flooding; seasonal high water table.	Severe:[1] very frequent, brief flooding.	Severe: very frequent, brief flooding; seasonal high water table.	Severe: very frequent, brief flooding; seasonal high water table.

See footnote at end of table.

of soils for town and country planning—Continued

Picnic areas	Campsites	Playgrounds	Golf fairways	Paths and trails	Trafficways	Suitability as source of topsoil
Moderate: slope.	Moderate: slope.	Severe: slope	Moderate: slope.	Slight	Severe: hard rock at a depth of 4 to 6 feet.	Good.
Moderate: rock	Severe: rock	Severe: rock	Severe: rock	Severe: steep slope.	Severe: rock	Poor.
Moderate: frequent, extremely brief flooding.	Moderate: frequent, extremely brief flooding.	Moderate: frequent, extremely brief flooding.	Moderate: frequent, extremely brief flooding.	Moderate: frequent, extremely brief flooding.	Moderate: frequent, extremely brief flooding.	Good.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor.
Moderate: slope.	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.	Severe: hard rock at a depth of 3 to 5 feet; slope.	Fair to poor.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope	Fair to poor.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor.
Slight to moderate: slope.	Moderate: slope.	Severe: slope	Moderate: slope.	Slight	Moderate: rock at a depth of about 18 inches.	Fair.
Moderate: frequent, brief flooding.	Moderate: frequent, brief flooding.	Severe: frequent, brief flooding.	Moderate: frequent, brief flooding.	Moderate: frequent, brief flooding.	Severe: frequent, brief flooding.	Good.
Slight	Slight	Slight	Slight	Slight	Moderate: traffic-supporting capacity.	Good.
Slight	Moderate: slope	Severe: slope	Slight	Slight	Moderate: traffic-supporting capacity.	Good.
Moderate: slope.	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Moderate to severe: slope.	Good.
Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: slope	Severe: stoniness; slope.	Moderate: stoniness; slope.	Severe: slope	Poor to fair.
Severe: very frequent, brief flooding; seasonal high water table.	Severe: very frequent, brief flooding; seasonal high water table.	Severe: very frequent, brief flooding.	Severe: very frequent, brief flooding; seasonal high water table.	Severe: very frequent, brief flooding; seasonal high water table.	Severe: very frequent, brief flooding; seasonal high water table.	Poor.

TABLE 2.—*Degree and kind of limitation*

Soil series and map symbols	Residences	Light industries	Septic tank filter fields	Sewage lagoons	Sanitary land fills	Cemeteries
Wickham:						
WgB	Slight	Slight	Slight	Moderate: slope.	Slight	Slight
WgC2	Slight	Moderate: slope.	Slight	Severe: slope.	Slight	Slight
WgE2	Moderate: slope.	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
WnC3	Slight	Moderate: moderate shrink-swell potential; slope.	Moderate: slope.	Severe: slope	Slight	Moderate: sandy clay loam surface layer.
WnE3	Moderate: slope.	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Moderate to severe: slope.
Wilkes: WpD	Severe: rock at a depth of about 20 inches.	Severe: rock at a depth of about 20 inches.	Severe: rock at a depth of about 20 inches.	Severe: slope	Severe: rock at a depth of about 20 inches.	Severe: rock at a depth of about 20 inches; slope.
Worsham: Wks	Severe: very frequent, brief flooding; seasonal high water table.	Severe: very frequent, brief flooding; seasonal high water table.	Severe: very frequent, brief flooding; seasonal high water table.	Severe:[1] very frequent, brief flooding.	Severe: very frequent, brief flooding; seasonal high water table.	Severe: very frequent, brief flooding; seasonal high water table.

[1] Limitations are slight or moderate where probable flood damage to dikes is slight.

The important properties are wetness, flooding, slope, texture of the surface layer, stoniness, and rockiness (fig. 11).

Campsites.—These areas are suitable for tents and small camp trailers and for outdoor living for periods of 3 to 14 days. They are used frequently and should withstand heavy foot traffic. Vehicles are confined to access roads. Generally, campsites require little site preparation other than leveling areas used for tents or for parking. Wetness, flooding, slope, texture of the surface layer, rockiness, and stoniness are considered.

Playgrounds.—These are areas used intensively for play, for example, baseball, badminton, and other organized games. Extensive site preparation is not needed. Important properties are wetness, flooding, permeability, texture of the surface layer, stoniness, and rockiness.

Golf fairways.— The ratings in table 2 refer only to the fairways; most golf greens are manmade. The important soil properties are flooding, wetness, slope, permeability, texture of the surface layer, stoniness, and rockiness.

Paths and trails.—These are areas used for hiking, bridle paths, and other nonintensive uses. The areas need little soil excavation and are as they occur in nature. The properties considered are wetness, flooding, slope, texture of the surface layer, rockiness, and stoniness.

Trafficways.—As used in this survey, this term refers to low-cost roads and streets in residential areas that require limited cut and fill and subgrade material. The properties considered are slope, depth to hard rock and to the water table, flooding, and traffic-supporting capacity.

Topsoil.—This refers to soil material suitable for use on areas where vegetation can be established and maintained. Features considered are productivity, content of coarse fragments, and depth of the material at the source of supply.

Use of the Soils in Engineering [2]

Some soil properties are of special interest to engineers because they affect the construction and maintenance of roads, airports, pipelines, building foundations, erosion control structures, facilities for water storage, drainage systems, and sewage disposal systems. Among the properties important in engineering are permeability, shear strength, compaction characteristics, shrink-swell characteristics, drainage, grain-size, plasticity, and reaction.

[2] E. R. DANIELS, civil engineer, Soil Conservation Service, helped prepare this section.

of soils for town and country planning—Continued

Picnic areas	Campsites	Playgrounds	Golf fairways	Paths and trails	Trafficways	Suitability as source of topsoil
Slight	Slight	Moderate: slope.	Slight	Slight	Slight	Fair.
Slight	Moderate: slope.	Severe: slope	Slight	Slight	Slight	Fair.
Moderate: slope.	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.	Moderate: moderate traffic-supporting capacity; slope.	Fair.
Moderate: sandy clay loam surface layer.	Moderate: sandy clay loam surface layer; slope.	Severe: slope	Moderate: slope.	Moderate: sandy clay loam surface layer.	Moderate: moderate traffic-supporting capacity.	Poor.
Moderate: slope.	Severe: slope	Severe: slope	Severe: slope	Moderate: sandy clay loam surface layer.	Moderate to severe: slope.	Poor.
Moderate: slope.	Moderate: slope.	Severe: slope	Moderate: cobblestones on surface.	Slight to moderate: cobblestones on surface; slope.	Severe: low traffic-supporting capacity; slope.	Poor.
Severe: very frequent, brief flooding; seasonal high water table.	Severe: very frequent, brief flooding; seasonal high water table.	Severe: very frequent, brief flooding.	Severe: very frequent, brief flooding; seasonal high water table.	Severe: very frequent, brief flooding; seasonal high water table.	Severe: very frequent, brief flooding; seasonal high water table.	Poor.

Depth to the water table, depth to bedrock or to sand and gravel, and topography also are important.

The information in this survey can be used to—

1. Make soil and land use studies that will aid in selecting and developing industrial, business, residential, and recreational sites.
2. Make preliminary estimates of the engineering properties of soils in planning drainage systems, farm ponds, irrigation systems, terraces and diversions, waterways, and other structures for conservation of soil and water.
3. Make preliminary evaluations that will aid in selecting locations for highways, airports, pipelines, and other engineering structures and in planning detailed investigations at selected locations.
4. Correlate performance with soil mapping units to develop information that will be useful in planning engineering practices and in designing and maintaining engineering structures.
5. Determine the suitability of soils for cross-country movement of vehicles and construction equipment.
6. Supplement other publications, such as maps, reports, and aerial photographs, that are used in preparation of engineering reports for a specific area.

With the soil map for identification of soil areas, the engineering interpretations given in tables 3, 4, and 5 can be useful for many purposes. It should be emphasized, however, that the interpretations may not eliminate the need for sampling and testing at the site of specific engineering works involving heavy loads and excavations deeper than the depth of layers here reported. Some of the terms used by soil scientists have a special meaning in soil science and may not be familiar to engineers. These terms are defined in the Glossary.

Engineering Classification Systems

The two systems most commonly used in classifying soils for engineering are the systems approved by the American Association of State Highway Officials (AASHO) and the Unified system.

The AASHO system (*2*) is used to classify soils according to those properties that affect use in highway construction. In this system all soil material is classified in seven principal groups. The groups range from A–1, which consists of soils that have the highest bearing

Figure 11.—**A suitable site for picnicking and camping on Tallapoosa fine sandy loam, 6 to 15 percent slopes; Allatoona Lake is in the background.**

strength and are the best soils for subgrade, to A–7, which consists of soils that have the lowest strength when wet. Within each group, the relative engineering value of the soil material is indicated by a group index number. The numbers range from 0, for the best material, to 20 for the poorest. The group index number is shown in parentheses following the soil group symbol (see table 3).

In the Unified system (*12*) soils are identified according to particle-size distribution, plasticity, and liquid limit. Soil materials are identified as coarse grained, fine grained, and highly organic. Some soil materials have characteristics that are borderline between two classes and are given a borderline classification, such as MH–CH. The last column of table 3 gives the classification of the tested soils according to the Unified system.

Soil scientists use the USDA textural classification. The texture of the soil is determined according to the proportion of soil particles smaller than 2 millimeters in diameter; that is, the proportion of sand, silt, and clay.

Engineering Test Data

Soil samples from 12 soil profiles representing five series were tested in accordance with standard procedures (see table 3). The samples for each series were from different locations and were collected from significant horizons in the soil profiles to a depth of 31 to 72 inches. The data therefore may not be adequate for estimating the properties of soils in deeper cuts. These samples were tested for moisture density relationships, volume change, grain-size distribution, liquid limit, and plasticity index.

In the moisture density, or compaction test, a sample of the soil material is compacted several times under a constant compactive effort, each time at a successively higher moisture content. The density of the compacted material increases as the moisture content increases until the optimum moisture content is reached. After that the density decreases with increase in moisture content. The highest density obtained in the compaction test is termed "maximum dry density." Moisture-density data are important in earthwork, for as a rule, optimum stability is obtained if the soil is compacted to about the maximum dry density at approximately the optimum moisture content.

The volume changes listed in table 3 indicate the amount of shrinkage or swelling in samples prepared at optimum moisture content and then subjected to drying and wetting. The sum of these values gives the total volume change that can occur in a specified soil.

The results of the mechanical analysis, obtained by combined sieve and hydrometer methods, may be used to determine the relative proportions of the different size particles that make up the soil sample. The percentage of fine-grained material obtained by the hydrometer method, generally used by engineers, should not be used in naming textural classes for soils.

The tests to determine liquid limit and plastic limit measure the effect of water on consistence of the soil material. As the moisture content of a clayey soil increases from a very dry state, the material changes from a semisolid to a plastic state. As the moisture content is further increased, the material changes from a plastic to a liquid state. The *plastic limit* is the moisture content at which the soil material passes from a semisolid to a plastic state. The *liquid limit* is the moisture content at which the soil material passes from a plastic to a liquid state. The *plasticity index* is the numerical difference between liquid limit and plastic limit. It indicates the range of moisture content within which a soil material is in a plastic condition.

Engineering Properties

Table 4 gives estimated soil properties that are significant in engineering. The estimates are based on test data in table 3, on field experience gained from working with the soils in the survey area and similar soils in adjoining counties, and on information in other parts of this survey. Because the estimates are based on more than one sample, some variation from the recorded values can be expected.

The figures showing depth from the surface generally are those of major horizons of the typical profile for the series. Detailed descriptions are given in the section "Descriptions of the Soils."

Permeability refers to the movement of water downward through undisturbed soil material. In table 4 permeability is estimated in inches of water percolation based on undisturbed cores of saturated soils.

The available water capacity refers to the capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Reaction, which refers to the intensity of acidity or alkalinity of a soil, is expressed in pH values. The degrees of acidity or alkalinity are described under "Reaction" in the Glossary.

Shrink-swell potential indicates the volume change to be expected of the soil material with a change in moisture content. It is estimated on the basis of the amount and type of clay in the soil layers. In general, soils classified as A-7 and CH have high shrink-swell potential. Clean sands and gravel and soils having small amounts of nonplastic to slightly plastic material have low shrink-swell potential.

Engineering Interpretations

Estimates of the suitability of soils for various engineering uses are given in table 5. The information in table 5 is based on the estimated data in table 4, on the actual test data in table 3, and on field experience.

No ratings are given in table 5 for the suitability of a soil as a source of sand or gravel. These materials are not deposited in the survey area in sufficient amounts to be of great commercial value. The only sources of sand are along some of the major streams. The many rocks that are in the area are possible sources of dense rock products of high quality.

The suitability of a soil for use as road fill is based on the performance of the soil material when excavated and used as borrow material for highway subgrade. It depends largely on bearing capacity and trafficability, rockiness, depth to bedrock, depth to water table, and susceptibility to flooding. The same features that apply to road fill generally apply to highway location, but also considered are shrink-swell potential and erodibility. In the survey area, the hazard of flooding on many streams has been reduced or controlled by the use of flood-retarding structures.

Soil features considered in constructing dikes and levees are stability, shear strength, shrink-swell potential, depth to rock, presence of loose rock, and susceptibility to seepage.

Important features considered in selecting a site for a reservoir or a farm pond are the permeability and the seepage of the underlying material. Greater than normal loss of water can be expected if soils underlying reservoir areas have rapid permeability and excess seepage. Usually, soils that have moderate or slow permeability are better suited to reservoirs. Stable embankments generally can be constructed of soil material that has moderate strength and stability, but care should be taken if soil material of low strength and stability is used.

Agricultural drainage is needed for some soils on first bottoms and for some on uplands and terraces. Drainage can be improved in wet soils that have moderate or moderately slow permeability if adequate outlets for drainage systems are available. Subsurface drainage is difficult on soils that have slow permeability.

Generally, only the soils suitable for crops are suitable for irrigation. Best results are obtained on nearly level, well-drained soils that have moderate to moderately rapid infiltration and high available water capacity. Soils that are slightly sloping can be irrigated, but they are more susceptible to erosion.

Terraces and waterways for controlling erosion can be established to protect upland soils that are cultivated. Stones and boulders, bedrock near the surface, and steep slopes interfere with the building of terraces. Terraces are difficult to build and maintain in areas where slopes are more than 10 percent. Erodibility and difficulty in estab-

TABLE 3.—*Engineering*

[Tests performed by the State Highway Department of Georgia in cooperation with U.S. Department of Commerce,

Soil name and location	Parent material	SCS report No. S63–Ga–	Depth	Moisture density [1]		Volume change [2]		
				Maximum dry density	Optimum moisture	Shrinkage	Swelling	Total volume change
			Inches	*Lb. per cu. ft.*	*Percent*	*Percent*	*Percent*	*Percent*
Buncombe loamy sand.								
Cherokee County: On Georgia State Highway No. 5, 0.5 mile east of Little River Bridge, and 0.2 mile north of Woodstock. (Modal profile.)	Recent alluvium.	28–1–5	15–51	100	16	0. 0	2. 3	2. 3
Cherokee County: 300 yards south of cotton mill in Canton, south of Georgia State Highway No. 5. (Nonmodal: finer textured and thinner surfaced than modal profile.)	Recent alluvium.	6–1	0–7	108	14	. 0	5. 2	5. 2
		6–3	18–31	98	17	. 0	. 4	. 4
Gwinnett sandy clay loam.								
Cherokee County: 1 mile southwest of Toonigh Baptist Church and west of Georgia State Highway No. 5. (Modal profile.)	Basic and acidic rock.	28–2–1	0–6	111	14	5. 2	2. 5	7. 7
		2–2	6–30	100	22	2. 3	1. 8	4. 1
		2–4	48–60	96	21	6. 2	4. 4	10. 6
Cherokee County: 2.5 miles northwest of Mount Gilead Church. (Nonmodal: finer textured than modal profile.)	Basic and acidic rock.	4–1	0–7	110	17	3. 4	4. 0	7. 4
		4–2	7–22	99	22	7. 7	. 3	8. 0
		4–4	30–52	100	22	2. 3	6. 5	8. 8
Cherokee County: 1 mile west of Macedonia Baptist Church and 500 yards south of Georgia State Highway No. 20. (Nonmodal: coarser textured and thinner surfaced than modal profile.)	Basic and acidic rock.	5–1	0–8	106	18	6. 1	3. 5	9. 6
		5–2	8–21	85	32	8. 4	4. 3	12. 7
		5–4	32–50	98	20	1. 4	12. 1	13. 5
Hayesville fine sandy loam.								
Gilmer County: 2 miles west of Cross Roads Baptist Church along Highway No. 282. (Modal profile.)	Mica-schist and gneiss.	61–1–1	0–7	95	20	2. 9	5. 1	8. 0
		1–3	11–29	93	26	8. 5	4. 5	13. 0
		1–4	29–50	98	21	5. 2	10. 3	15. 5
Gilmer County: 1 mile south of Flat Creek on Flat Creek Road. (Nonmodal: finer textured than modal profile.)	Schist and gneiss.	3–1	0–7	98	20	4. 1	6. 6	10. 7
		3–3	11–32	98	23	5. 6	2. 0	7. 6
		3–4	32–72	102	21	1. 3	12. 2	13. 5
Gilmer County: 1 mile northeast of Cartecay Road and 0.8 mile north of Georgia State Highway No. 52. (Nonmodal: coarser textured than modal profile.)	Schist and gneiss with mica flakes.	2–1	0–6	105	17	1. 4	2. 5	3. 9
		2–3	10–24	98	23	6. 8	2. 8	9. 6
		2–5	36–60	106	17	. 8	13. 7	14. 5
Madison fine sandy loam.								
Pickens County: 0.5 mile west of Salem Baptist Church. (Modal profile.)	Micaceous gneiss and schist.	112–2–1	0–8	106	16	2. 7	4. 4	7. 1
		2–3	11–23	93	26	6. 0	7. 6	13. 6
		2–5	28–46	103	17	1. 9	26. 5	28. 4
Pickens County: 1.5 miles east of Hinton and 200 yards south of Georgia State Highway No. 53. (Nonmodal: coarser textured than modal.)	Micaceous gneiss, schist, and some basic rock.	1–2	6–17	99	20	8. 4	18. 5	26. 9
		1–3	17–29	103	18	5. 8	26. 2	32. 0
		1–4	29–42	109	16	2. 0	15. 1	17. 1

See footnotes at end of table.

test data

Bureau of Public Roads (BPR), according to standard procedures of the American Association of State Highway Officials (AASHO)(*2*)]

Mechanical analysis [3]										Liquid limit	Plasticity index	Classification	
Percentage passing sieve—						Percentage smaller than—						AASHO	Unified [4]
1-in.	¾-in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.	*Percent*			
--------	--------	--------	100	98	13	10	6	4	3	[5] NP	[5] NP	A-2-4(0)	SM
--------	--------	--------	100	90	18	14	10	5	4	NP	NP	A-2-4(0)	SM
--------	--------	--------	100	98	7	6	4	3	2	NP	NP	A-3(0)	SP-SM
--------	100	99	98	81	50	46	40	29	22	25	9	A-4(3)	SC
--------	--------	100	98	86	70	69	62	48	41	45	21	A-7-6(12)	CL
--------	100	99	99	80	54	50	43	29	27	45	NP	A-5(4)	ML
100	99	91	84	76	45	39	34	25	20	26	9	A-4(2)	SC
--------	--------	100	99	92	71	66	60	48	46	39	17	A-6(10)	CL
--------	100	98	94	85	61	56	47	33	27	NP	NP	A-4(5)	ML
100	99	93	89	83	50	46	42	33	28	31	10	A-4(3)	SM-SC
--------	100	98	97	93	79	78	76	65	61	64	26	A-7-5(18)	MH
--------	--------	--------	100	90	46	40	37	26	24	NP	NP	A-4(2)	SM
--------	100	98	96	91	60	55	38	22	16	NP	NP	A-4(5)	ML
--------	--------	--------	100	98	72	70	57	48	41	47	20	A-7-6(13)	ML-CL
--------	--------	--------	100	99	62	61	48	34	30	NP	NP	A-4(5)	ML
[6] 96	95	90	82	77	54	48	35	22	17	NP	NP	A-4(4)	ML
--------	--------	--------	100	98	81	73	67	55	52	44	16	A-7-6(11)	ML-CL
--------	100	99	96	88	56	56	39	26	21	NP	NP	A-4(4)	ML
100	98	95	93	89	56	48	34	21	17	NP	NP	A-4(4)	ML
--------	--------	--------	100	99	72	68	59	74	43	41	11	A-7-5(8)	ML
--------	--------	100	99	85	39	34	20	9	6	NP	NP	A-4(1)	SM
[7] 99	97	83	75	62	46	40	26	15	10	NP	NP	A-4(2)	SM
--------	100	97	92	87	78	78	67	51	45	53	23	A-7-5(16)	MH-CH
--------	100	95	90	80	63	57	40	19	12	NP	NP	A-4(6)	ML
--------	100	99	97	94	68	67	55	45	39	42	21	A-7-6(11)	CL
--------	100	99	98	95	64	62	45	32	28	30	7	A-4(6)	ML-CL
--------	100	95	87	55	22	18	10	4	4	NP	NP	A-2-4(0)	SM

TABLE. 3—*Engineering*

Soil name and location	Parent material	SCS report No. S63-Ga-	Depth	Moisture density [1]		Volume change [2]		
				Maximum dry density	Optimum moisture	Shrinkage	Swelling	Total volume change
			Inches	*Lb. per cu. ft.*	*Percent*	*Percent*	*Percent*	*Percent*
Tusquitee loam.								
Gilmer County: 0.25 mile north of second bridge on Owltown Road. (Modal profile.)	Old local alluvium.	61-6-1	0-7	109	15	1. 9	4. 1	6. 0
		6-2	7-22	104	19	9. 9	11. 2	21. 1
		6-4	34-53	100	23	7. 4	20. 6	28. 0
Gilmer County: North of Ellijay and and 0.25 mile north of U.S. Highway No. 76 along county road. (Nonmodal: coarser textured than modal profile.)	Old local alluvium.	4-1	0-7	91	21	1. 4	10. 0	11. 4
		4-3	12-36	102	21	3. 0	6. 8	9. 8
		4-4	36-54	100	21	3. 1	5. 7	8. 8

[1] Based on AASHO Designation: T 99-57, Methods A and C (*2*).
[2] Based on "A System of Soil Classification" by W. F. Abercrombie (*1*).
[3] Mechanical analyses according to the AASHO Designation: T 88-57 (*2*). Results by this procedure frequently may differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method

TABLE 4.—*Estimated*

[Absence of information indicates that determination

Soil series and map symbols	Depth to bedrock	Depth to seasonal high water table	Depth from surface	Classification
				Dominant USDA texture
	Feet	*Inches*	*Inches*	
Alluvial land: Ajc. Depth to bedrock 2 to 5 feet. Depth to seasonal high water table 15 inches. No valid estimates can be made for other properties.				
Appling: AmB2, AmC2, AmD2	>8	>50	0-6	Sandy loam
			6-10	Sandy clay loam
			10-44	Sandy clay and clay
			44-50	Sandy clay loam
			50-56	Saprolite.
Ashe: AcG, AEE, AEF. For Edneyville part of AEE and AEF, see Edneyville series.	2-5	>60	0-8	Loam, stony
			8-24	Loam, stony
			24-30	Weathered gneiss and hard rock.
Augusta: Afs	>10	15	0-8	Fine sandy loam
			8-26	Sandy clay loam and clay loam
			26-48	Loam
Buncombe: Bfs	>6	>60	0-56	Loamy sand
Cartecay. Mapped only with Chewacla soils.	>10	15	0-9	Loam
			9-40	Sandy loam and loam
			40-54	Stratified sand and loamy sand
Chewacla: Chc. For Cartecay part, see Cartecay series.	>10	14	0-8	Loam
			8-34	Light clay loam and loam
			34-48	Sandy loam

test data—Continued

Mechanical analysis [3]										Liquid limit	Plasticity index	Classification	
Percentage passing sieve—						Percentage smaller than—						AASHO	Unified [4]
1-in.	¾-in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.				
										Percent			
[7] 99	99	98	96	94	50	48	27	17	15	NP	NP	A-4(3)	SM
---------	---------	---------	100	99	69	64	48	36	33	35	12	A-6(8)	ML-CL
---------	100	99	98	96	64	62	46	39	31	47	21	A-7-6(11)	ML-CL
100	99	95	86	68	52	52	36	15	9	NP	NP	A-4(3)	ML
100	99	94	87	75	67	64	50	33	26	41	12	A-7-6(7)	ML
---------	100	98	94	89	83	82	66	39	29	36	8	A-4(8)	ML

and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soils.

[4] SCS and BPR have agreed to consider that all soils having plasticity indexes within two points from A-line are to be given a borderline classification. Examples of borderline classifications obtained by this use are ML-CL and MH-CH.

[5] Nonplastic.

[6] 100 percent of the soil material passed the 3-inch sieve.

[7] 100 percent of the soil material passed the 1½-inch sieve.

engineering properties

was not made or was not applicable]

Classification—Continued		Percentage passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHO	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)				
					Inches per hour	*Inches per inch of soil*	*pH*	
SM	A-2	95–100	95–100	20–35	2. 0–6. 3	0. 12	4. 5–6. 5	Low.
ML-CL	A-6	90–100	90–100	50–60	0. 63–2. 0	. 14	4. 5–5. 0	Moderate.
MH-CH or CL	A-7	95–100	95–100	60–75	0. 63–2. 0	. 13	4. 5–5. 0	Moderate.
SM, SC	A-4 or A-6	95–100	95–100	40–50	0. 63–2. 0	. 11	4. 0–4. 5	Low to moderate.
SM	A-4 or A-2	65–80	65–80	30–40	>6. 3	. 13	5. 1–5. 5	Low.
SM	A-2 or A-4	70–80	70–80	25–40	2. 0–6. 3	. 12	5. 1–5. 5	Low.
SM	A-2 or A-4	95–100	95–100	25–40	2–0–6. 3	. 12	4. 5–5. 0	Low.
ML or CL	A-6 or A-4	95–100	95–100	50–65	0. 63–2. 0	. 14	4. 5–5. 5	Moderate.
ML	A-4	95–100	95–100	50–60	0. 63–2. 0	. 14	4. 5–5. 0	Low.
SP-SM or SM	A-2 or A-3	100	98–100	7–25	>6. 3	. 08	4. 5–5. 0	Low.
SM or SC	A-2 or A-4	95–100	95–100	30–45	2. 0–6. 3	. 13	5. 6–6. 0	Low.
SM	A-2 or A-4	95–100	95–100	20–40	2. 0–6. 3	. 12	5. 6–6. 0	Low.
SM	A-2	90–100	95–100	10–25	>6. 3	. 10	5. 6–6. 0	Low.
ML or CL	A-4	100	95–100	50–60	2. 0–6. 3	. 15	5. 6–6. 0	Low.
ML or CL	A-4 or A-6	100	95–100	60–70	0. 63–2. 0	. 14	5. 6–6. 0	Moderate.
SM or SC	A-4 or A-5	89–100	90–100	40–50	2. 0–6. 3	. 14	5. 1–5. 5	Low.

TABLE 4.—*Estimated*

Soil series and map symbols	Depth to bedrock	Depth to seasonal high water table	Depth from surface	Classification: Dominant USDA texture
	Feet	*Inches*	*Inches*	
Dekalb: DtD, DuE, DuF	2–5	>60	0–8	Fine sandy loam, stony
			8–33	Fine sandy loam and sandy loam
			33–60	Soft weathered sandstone.
			60	Hard sandstone bedrock.
Edneyville. Mapped only with Ashe soils.	3½–5	>60	0–7	Loam, stony
			7–30	Clay loam, stony
			30–52	Weathered mica-gneiss and bedrock.
Grover: GiB, GiC2, GiD	>10	30–60	0–8	Fine sandy loam
			8–27	Clay loam and sandy clay loam
			27–38	Loam
			38–60	Saprolite.
Gwinnett: GdB2, GdD3, GdE3, GgB2, GgC2, GgE2	>6	>60	0–6	Loam
			6–24	Clay
			24–36	Clay loam
			36–44	Soft weathered rock.
			44–52	Weathered hard and soft rock.
Hayesville: HIB, HIC, HIE, HJC3, HJE3	>6	>60	0–7	Fine sandy loam
			7–35	Clay loam and clay
			35–60	Clay in fractured soft rock
Helena: HYC	3–5	15	0–10	Sandy loam
			10–43	Clay and sandy clay
			43–54	Sandy clay loam
Hiwassee: HSB, HSC, HTD3	>10	>60	0–6	Loam
			6–88	Clay loam and clay
Madison: MiC2, MjB, MjC, MjD	>10	>60	0–6	Fine sandy loam
			6–10	Sandy clay loam
			10–27	Clay loam
			27–33	Sandy clay loam
			33–42	Weathered mica-schist
Masada: MoA, MoB, MoC2, MpC, MyD2	>10	30–36	0–8	Fine sandy loam
			8–50	Clay loam
			50–60	Soft loamy regolith.
Musella: MCE	>5	>60	0–6	Cobbly loam
			6–24	Cobbly and gravelly clay loam
			24–48	Broken rock.
Porters: PcD	4–6	>60	0–10	Loam
			10–36	Loam and clay loam
			36–42	Sandy loam
			42–48	Soft weathered rock.
Rock land: Roc. No valid estimates can be made.				
Starr: Sta	>10	36	0–9	Loam
			9–52	Loam
Talladega: TeG, TRE, TRF	3–5	>60	0–9	Channery loam
			9–22	Channery silty clay loam
			22–26	Broken rock.
Tallapoosa: TbE, TbF, TcD, TcE, ThE2, TjF	>5	>60	0–10	Fine sandy loam
			10–18	Silty clay loam
			18–26	Weathered soft saprolite.
Toccoa: Toe	>10	36	0–42	Fine sandy loam
			42–54	Gravelly fine sandy loam

engineering properties—Continued

Classification—Continued		Percentage passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHO	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)				
					Inches per hour	*Inches per inch of soil*	*pH*	
SM or GM	A-2 or A-4	40-60	40-60	30-45	>6. 3	0. 09	4-5. 5. 0	Low.
ML	A-4	60-70	60-70	50-65	>6. 3	. 11	4. 5-5. 0	Low.
SM	A-2 or A-4	75-85	75-85	30-40	>6. 3	. 13	4. 5-5. 0	Low.
ML or CL	A-4 or A-5	65-80	65-80	50-60	0. 63-2. 0	. 14	5. 1-5. 5	Low.
SM	A-2	100	100	25-35	>6. 3	. 12	4. 5-5. 0	Low.
ML or CL	A-6 or A-7	100	100	50-60	0. 63-2. 0	. 13	4. 5-5. 0	Moderate.
ML or CL	A-6 or A-7	95-100	95-100	50-60	0. 63-2. 0	. 13	4. 5-5. 0	Moderate.
SM or SC	A-4	90-100	80-100	40-50	>6. 3	. 13	5. 1-5. 5	Low.
MH or CL	A-7 or A-6	90-100	90-100	65-80	0. 63-2. 0	. 13	5. 1-6. 0	Moderate.
CL, SM, or ML	A-6 or A-4	95-100	95-100	45-65	0. 63-2. 0	. 13	5. 1-5. 5	Moderate to low.
ML or SM	A-4 or A-2	95-100	80-100	30-60	2. 0-6. 3	. 13	5. 1-5. 5	Low.
ML, ML-CL, or CL	A-7	95-100	95-100	70-85	0. 63-2. 0	. 13	5. 1-5. 5	Moderate.
SC, SM, or ML	A-4	40-100	40-100	36-65	2. 0-6. 3	. 13	5. 1-5. 5	Moderate to low.
SM	A-2 or A-4	95-100	95-100	25-40	2. 0-6. 3	. 10	5-1-5. 5	Low.
CL or CH	A-7	95-100	95-100	50-70	<0. 20	. 13	5. 1-5. 5	Moderate to high.
SC or CL	A-6	95-100	95-100	36-55	0. 20-0. 63	. 13	4. 5-5. 5	Moderate.
SM or SC	A-4	95-100	98-100	40-50	2. 0-6. 3	. 14	5. 1-5. 5	Low.
MH or CL	A-7	95-100	98-100	65-85	0. 63-2. 0	. 12	5. 1-5. 5	Moderate.
SM or SC	A-2 or A-4	90-100	80-100	30-45	2. 0-6. 3	. 13	5. 1-5. 5	Low.
SC or CL	A-6	95-100	90-100	36-55	0. 63-2. 0	. 13	5. 1-5. 5	Moderate.
MH, CL, ML-CL, or MH-CH	A-7	95-100	85-100	70-80	0. 63-2. 0	. 11	5. 1-5. 5	Moderate.
ML or CL	A-4 or A-6	95-100	95-100	50-60	0. 63-2. 0	. 10	5. 1-5. 5	Low.
SM	A-2	95-100	85-95	20-35	------------	----------	----------	
SM	A-2	95-100	95-100	25-35	2. 0-6. 3	. 12	5. 1-5. 5	Low.
CL or ML	A-6	95-100	95-100	50-60	0. 63-2. 0	. 15	5. 1-5. 5	Moderate.
SM or SC	A-2 or A-4	80-85	60-70	30-45	2. 0-6. 3	. 15	5. 6-6. 0	Low.
CL or ML-CL	A-7 or A-6	70-85	70-85	50-70	0. 63-2. 0	. 13	5. 6-6. 0	Moderate.
SM	A-4	95-100	85-100	36-45	2. 0-6. 3	. 17	5. 1-5. 5	Low.
SM, SC, or CL	A-4 or A-6	95-100	85-100	40-55	2. 0-6. 3	. 14	5. 1-6. 0	Moderate.
SM	A-2 or A-4	95-100	85-100	25-40	2. 0-6. 3	. 10	5. 1-5. 5	Low.
SM or ML	A-4	100	95-100	40-55	>6. 3	. 15	5. 1-6. 0	Low.
CL	A-6	100	95-100	50-65	2. 0-6. 3	. 16	5. 1-6. 0	Low.
ML or GM	A-4	70-80	70-80	36-55	2. 0-6. 3	. 12	4. 5-5. 0	Low.
ML, CL, or GM	A-7	45-60	45-60	40-55	0. 63-2. 0	. 10	4. 5-5. 0	Moderate.
SM	A-4	70-80	70-80	36-45	2. 0-6. 3	. 12	4. 5-5. 0	Low.
CL or ML	A-7 or A-6	70-85	70-85	50-65	0. 63-2. 0	. 10	4. 5-5. 0	Moderate.
SM	A-2 or A-4	95-100	95-100	30-45	2. 0-6. 3	. 11	5. 6-6. 0	Low.
SM	A-2 or A-4	95-100	95-100	15-40	2. 0-6. 3	. 10	5. 6-6. 0	Low.

TABLE 4.—*Estimated*

Soil series and map symbols	Depth to bedrock	Depth to seasonal high water table	Depth from surface	Classification: Dominant USDA texture
	Feet	*Inches*	*Inches*	
Tusquitee: T1B, T1C, T1E, TmE	>10	>60	0–12	Loam
			12–66	Clay loam
			66–72	Loam
			72–86	Soft weathered saprolite.
Wehadkee: Wht	>10	(1)	0–19	Loam
			19–32	Sandy clay loam
			32–48	Sandy loam
Wickham: WgB, WgC2, WgE2, WnC3, WnE3 [2]	>6	>35	0–7	Fine sandy loam
			7–66	Sandy clay loam and clay loam
			66–72	Gravel and sand
Wilkes: WpD	2–5	30	0–5	Cobbly loam
			5–19	Cobblestones and larger stones mixed with clay and clay loam.
			19–52	Partly weathered schist.
Worsham: Wks	>5	(1)	0–5	Fine sandy loam
			5–11	Sandy clay loam
			11–32	Sandy clay
			32–52	Sandy clay loam

[1] Water table is at the surface.

TABLE 5.—Engineering

Soil series and map symbols	Suitability as a source of road fill	Soil features affecting— Highway location	Soil features affecting— Dikes or levees	Soil features affecting— Farm ponds: Reservoir area
Alluvial land: Ajc	Good	Seasonal high water table; flood hazard.	Moderate strength and stability; cobblestones.	Variable permeability; high seepage potential.
Appling: AmB2, AmC2, AmD2.	Fair: fair traffic-supporting capacity.	Features generally favorable.	Moderate shrink-swell potential; moderate strength and stability.	Features generally favorable.
Ashe: AcG, AEE, AEF. For Edneyville part of AEE and AEF, see Edneyville series.	Good except where shallow over rock.	Rock at a depth of 2 to 5 feet.	Moderate strength and stability; coarse rock fragments to a depth of 2 feet.	Moderately rapid permeability; moderate to high seepage potential.
Augusta: Afs	Fair: seasonal high water table.	Seasonal high water table.	Moderate shrink-swell potential.	Features generally favorable.
Buncombe: Bfs	Good	Moderate strength and stability; occasional flooding.	Moderate strength; moderate seepage potential.	Rapid permeability; high seepage potential.
Cartecay. Mapped only with Chewacla soils.	Fair to good: fair to good traffic-supporting capacity.	Seasonal high water table; flood hazard.	Moderate strength and stability.	Moderately rapid permeability; moderate seepage potential.
Chewacla: Chc. For Cartecay part, see Cartecay series.	Fair: fair traffic-supporting capacity.	Seasonal high water table; flood hazard.	Moderate strength and stability.	Features generally favorable.

engineering properties—Continued

Classification—Continued		Percentage passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHO	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)				
					Inches per hour	*Inches per inch of soil*	*pH*	
SM or ML	A-4 or A-5	95–100	85–100	40–55	2. 0–6. 3	0. 17	5. 1–5. 5	Low.
ML or ML-CL	A-6, A-7 or A-4	90–100	85–100	60–75	2. 0–6. 3	. 17	5. 1–5. 5	Moderate.
SM or ML	A-4	90–100	85–95	45–55	2. 0–6. 3	. 17	5. 1–5. 5	Low.
ML	A-4	95–100	95–100	50–60	0. 63–2. 0	. 15	5. 5–6. 5	Low.
CL or SC	A-6	95–100	95–100	35–55	0. 63–2. 0	. 14	5. 6–6. 0	Moderate.
SM	A-2	100	95–100	15–25	>6. 3	. 12	5. 6–6. 0	Low.
SM	A-2	95–100	95–100	25–35	2. 0–6. 3	. 13	4. 5–5. 0	Low.
CL, SM, or ML	A-6	95–100	95–100	45–55	0. 63–2. 0	. 14	4. 5–5. 5	Moderate.
SP or SM	A-2	90–100	85–100	5–15	2. 0–6. 3	. 08	4. 5–5. 5	Low.
SM or ML	A-2 or A-4	75–85	70–85	20–55	0. 63–2. 0	. 10	5. 1–5. 5	Low.
GM or GC	A-4	50–65	50–65	36–50	0. 20–0. 63	. 12	5. 1–6. 0	Moderate.
SM	A-2 or A-4	95–100	95–100	20–45	0. 63–2. 0	. 13	4. 5–5. 0	Low.
SC or CL	A-6	100	95–100	45–55	0. 20–0. 63	. 15	4. 5–5. 5	Moderate.
CL or MH	A-7	95–100	95–100	60–70	<0. 20	. 18	4. 5–5. 5	Moderate to high.
SL or CL	A-6	95–100	95–100	45–55	0. 20–0. 63	. 12	4. 5–5. 0	Moderate.

[2] AASHO and Unified classifications are likely to vary because the surface layer of this soil is more eroded than is typical for the series.

interpretations

Soil features affecting—Continued				
Farm ponds—Continued: Embankment	Agricultural drainage	Irrigation	Terraces	Waterways
Moderate strength and stability; cobblestones.	Seasonal high water table; flood hazard.	Cobblestones on surface; variable intake rate.	Relief nearly level	Seasonal high water table.
Moderate strength and stability; moderate shrink-swell potential.	Good drainage	Features generally favorable if slope is less than 6 percent.	Features generally favorable if slope is less than 10 percent.	Features generally favorable if slope is less than 10 percent.
Moderate strength and stability; coarse fragments to a depth of 2 feet.	Somewhat excessive drainage.	Slope	Slope	Slope.
Moderate shrink-swell potential.	Seasonal high water table.	Moderately rapid intake; wetness.	Relief nearly level; seasonal high water table.	Seasonal high water table.
Moderate strength and stability; moderate seepage potential.	Excessive drainage; flooding.	Low available water capacity.	Relief nearly level	Loamy sand texture; low available water capacity.
Moderate strength and stability.	Seasonal high water table; flood hazard.	Features generally favorable.	Relief nearly level; seasonal high water table.	Seasonal high water table.
Moderate strength and stability.	Seasonal high water table; flood hazard.	Features generally favorable.	Relief nearly level; seasonal high water table.	Seasonal high water table.

TABLE 5.—Engineering

Soil series and map symbols	Suitability as a source of road fill	Soil features affecting—		
		Highway location	Dikes or levees	Farm ponds: Reservoir area
Dekalb: DtD, DuE, DuF	Good except where shallow over bedrock.	Bedrock at a depth of 2 to 5 feet.	Moderate strength and stability; coarse fragments.	Rapid permeability; moderate seepage potential.
Edneyville. Mapped only with Ashe soils.	Fair: rock at a depth of 3½ to 5 feet.	Slope; rock at a depth of 3½ to 5 feet.	Moderate strength and stability; coarse fragments at a depth of 3½ to 5 feet.	Moderate permeability; moderate seepage potential.
Grover: GiB, GiC2, GiD	Fair: fair traffic-supporting capacity.	Features generally favorable.	Moderate strength and stability.	Moderate permeability; moderate seepage potential.
Gwinnett: GdB2, GdD3, GdE3, GgB2, GgC2, GgE2.	Fair: fair traffic-supporting capacity.	Weathered and broken rock below a depth of about 3½ feet.	Moderate strength and stability.	Moderate permeability; moderate seepage potential.
Hayesville: HIB, HIC, HIE, HJC3, HJE3.	Fair: fair traffic-supporting capacity.	Features generally favorable.	Moderate strength and stability; moderate shrink-swell potential.	Features generally favorable.
Helena: HYC	Poor: poor traffic-supporting capacity.	Moderate to high shrink-swell potential.	Moderate to high shrink-swell potential.	Features generally favorable.
Hiwassee: HSB, HSC, HTD3.	Fair to poor: fair to poor traffic-supporting capacity.	Hazard of erosion in deep cuts; moderate shrink-swell potential.	Moderate strength and stability; moderate shrink-swell potential.	Features generally favorable.
Madison: MiC2, MjB, MjC, MjD.	Fair: fair traffic-supporting capacity.	Moderate strength and stability.	Moderate strength and stability.	Micaceous rock at a depth of about 3 feet; moderate to high seepage potential.
Masada: MoA, MoB, MoC2, MpC, MyD2.	Good	High strength and stability.	High strength and stability.	Moderate permeability
Musella: MCE	Poor: coarse fragments; broken rock at a depth of 2 to 3 feet.	Coarse fragments	Moderate strength and stability; broken rock at a depth of about 2 to 3 feet.	Moderate permeability; moderate seepage potential.
Porters: PcD	Good: coarse fragments below a depth of 2 feet.	Bedrock at a depth of 4 to 6 feet.	Moderate strength and stability; moderate seepage potential.	Moderately rapid permeability; moderate seepage potential.
Rock land: Roc. No interpretations; material too variable.				
Starr: Sta	Good	Moderate to high strength and stability.	Moderate to high strength and stability.	Moderately rapid permeability; moderate seepage potential.
Talladega: TeG, TRE, TRF.	Poor: coarse fragments.	Moderate strength and stability; slope.	Moderate strength and stability; moderate shrink-swell potential.	Moderate permeability; moderate seepage potential.
Tallapoosa: TbE, TbF, TcD, TcE, ThE2, TjF.	Fair: weathered rock below a depth of 18 inches.	Moderate strength and stability.	Moderate strength and stability; moderate shrink-swell potential.	Moderate permeability; moderate seepage potential.
Toccoa: Toe	Good	Occasional flooding	Moderate strength and stability.	Moderately rapid permeability.

interpretations—Continued

Soil features affecting—Continued				
Farm ponds—Continued: Embankment	Agricultural drainage	Irrigation	Terraces	Waterways
Moderate strength and stability.	Good drainage	Slope	Slope	Slope.
Coarse fragments at a depth of 3½ to 5 feet.	Good drainage	Slope	Slope	Slope.
Moderate strength and stability.	Good drainage	Features generally favorable if slope is less than 6 percent.	Features generally favorable if slope is less than 10 percent.	Features generally favorable if slope is less than 10 percent.
Moderate strength and stability.	Good drainage	Features generally favorable if slope is less than 6 percent.	Features generally favorable if slope is less than 10 percent.	Features generally favorable if slope is less than 10 percent.
Moderate strength and stability; moderate shrink-swell potential.	Good drainage	Features generally favorable if slope is less than 6 percent.	Features generally favorable if slope is less than 10 percent.	Features generally favorable if slope is less than 10 percent.
Moderate to high shrink-swell potential.	Seasonal high water table; slow permeability.	Slope	Features generally favorable.	Features generally favorable.
Moderate strength and stability; moderate shrink-swell potential.	Good drainage	Features generally favorable if slope is less than 6 percent.	Features generally favorable if slope is less than 10 percent.	Features generally favorable if slope is less than 10 percent.
Moderate strength and stability.	Good drainage	Features generally favorable if slope is less than 6 percent.	Features generally favorable if slope is less than 10 percent.	Features generally favorable if slope is less than 10 percent.
High strength and stability.	Good drainage	Features generally favorable if slope is less than 6 percent.	Features generally favorable if slope is less than 10 percent.	Features generally favorable if slope is less than 10 percent.
Moderate strength and stability; broken rock at a depth of 2 to 3 feet.	Good drainage to somewhat excessive drainage.	Slope	Slope	Slope.
Moderate strength and stability; moderate seepage potential.	Good drainage	Slope	Features generally favorable if slope is less than 10 percent.	Features generally favorable if slope is less than 10 percent.
Moderate to high strength and stability.	Good drainage	Features generally favorable.	Relief nearly level	Features generally favorable.
Moderate strength and stability.	Good drainage	Slope	Slope	Slope.
Moderate strength and stability.	Good drainage	Slope	Slope	Slope.
Moderate strength and stability.	Good drainage; flood hazard.	Features generally favorable.	Relief nearly level	Features generally favorable.

TABLE 5.—Engineering

Soil series and map symbols	Suitability as a source of road fill	Soil features affecting—		
		Highway location	Dikes or levees	Farm ponds: Reservoir area
Tusquitee: TlB, TlC, TlE, TmE.	Good	Moderate to high strength and stability.	Moderate to high strength and stability.	Moderately rapid permeability.
Wehadkee: Wht	Poor: wetness; seasonal high water table.	Seasonal high water table.	Low strength and stability; moderate shrink-swell potential.	Seasonal high water table.
Wickham: WgB, WgC2, WgE2, WnC3, WnE3.	Fair to good: fair to good traffic-supporting capacity.	High: strength and stability.	High strength and stability.	Moderate permeability
Wilkes: WpD	Poor: coarse rock fragments; rock at a depth of 2 to 5 feet.	Rock at a depth of 2 to 5 feet.	Rock at a depth of 2 to 5 feet; low strength and stability.	Coarse fragments; high seepage potential.
Worsham: Wks	Poor: wetness; seasonal high water table.	Seasonal high water table; moderate shrink-swell potential.	Moderate shrink-swell potential; moderate strength and stability.	Features generally favorable.

lishing vegetation interfere with the building and maintenance of waterways. A seasonal high water table is a limitation to the use of the equipment needed in shaping and seeding waterways.

Use of the Soils for Woodland [3]

Virgin forest covered about 98 percent of Cherokee, Gilmer, and Pickens Counties. Forest now covers about 82 percent of the acreage. Eastern white pine and Virginia pine are the principal trees on the higher elevations. Shortleaf pine, loblolly pine, eastern white pine, Virginia pine, red oak, and white oak grow on ridges and side slopes. Southern pine, hemlock, yellow-poplar, oak, hickory, gum, and maple grow along coves and on flood plains.

The information in the following pages is based on data gathered in the field by teams of foresters and soil scientists, by representatives of Federal and State agencies, and others. The interpretations will help woodland owners and managers in establishing and harvesting wood crops (7).

Woodland Suitability Groups

The management of woodland can be planned more effectively if soils are grouped according to those characteristics that affect the growth of trees and the management of the stands. The soils of Cherokee, Gilmer, and Pickens Counties have been grouped according to their suitability for trees. The 19 woodland groups are listed in table 6. Each group consists of soils that generally are suited to the same kinds of trees, that need similar management, and that have about the same potential productivity. The factors considered in placing each soil in a group include potential productivity, expressed as site index, species suitable for planting, and soil-related hazards and limitations.

For each woodland group, table 6 gives the degree of the hazards and limitations, shows the site index class for the principal trees, and lists the species suitable for planting. The ratings are based on pertinent research, measurements by foresters and soil scientists, and experience of woodland managers. Rock land has not been placed in a woodland group because trees suitable for commercial use do not grow on this land. Detailed information about the soils in each group is in the section "Descriptions of the Soils."

Each woodland group is identified by a three-part symbol. The first part of the symbol is a numeral that indicates the relative potential productivity of the soils in the group; 1 means very high, 2 high, 3 moderately high, 4 moderate, and 5 low. These ratings are based on field determinations of average site indexes.

The second part of the symbol identifying a woodland group is a small letter. Except for the letter *o*, this letter indicates an important soil property that imposes a moderate or severe limitation that affects management. The letter *o* indicates that the soils have few limitations that restrict their use. The letter *c* indicates that the main limitation is the kind or amount of clay; *f* that the soil is fragmental or skeletal; *r* that the main limitation is relief or slope; *s* that the soil is excessively sandy; *w* that wetness is the chief limitation; and *x* that stones or rocks in and on the soil are the chief limiting factor.

The third part of the symbol is a numeral that shows the degree of limitation and the suitability of the soils for

[3] W. P. THOMPSON, forester, Soil Conservation Service, assisted in preparing this section.

interpretations—Continued

Soil features affecting—Continued				
Farm ponds—Continued Embankment	Agricultural drainage	Irrigation	Terraces	Waterways
Moderate to high strength and stability.	Good drainage	Features generally favorable if slope is less than 6 percent.	Features generally favorable if slope is less than 10 percent.	Features generally favorable if slope is less than 10 percent.
Low strength and stability; moderate shrink-swell potential.	Seasonal high water table; flood hazard.	Seasonal high water table.	Relief nearly level	Seasonal high water table; flood hazard.
High strength and stability.	Good drainage	Features generally favorable if slope is less than 6 percent.	Features generally favorable if slope is less than 10 percent.	Features generally favorable if slope is less than 10 percent.
Coarse fragments; rock at a depth of 2 to 5 feet.	Good drainage	Coarse fragments; rock at a depth of 2 to 5 feet.	Coarse fragments; rock at a depth of 2 to 5 feet.	Coarse fragments; rock at a depth of 2 to 5 feet.
Moderate shrink-swell potential; moderate strength and stability.	Poor drainage; seasonal high water table.	Seasonal high water table; moderately slow to very slow permeability.	Relief nearly level	Seasonal high water table.

certain kinds of trees. Numerals 1, 2, and 3 identify soils that are well suited to needleleaf trees. The numeral 1 means that the soils have no particular limitation, 2 means one or more moderate limitations, and 3 means one or more severe limitations. Numerals 7, 8, and 9 identify soils that are well suited to both needleleaf and broadleaf trees. The numeral 7 means that the soils have no significant limitation, 8 means one or more moderate limitations, and 9 means one or more severe limitations.

Some of the terms used in table 6 are defined in the following paragraphs.

Potential productivity for a given species is generally expressed as site index. Site index is the average height, in feet, of the dominant or codominant trees. It is age 30 for cottonwoods, age 35 for sycamore, and age 50 for all other species. The index in table 6 has been rounded to units of 10 and is expressed as site index class.

The species listed in table 6 are those to be favored in existing stands and those preferable for planting. Selection of preferred species is based on growth, quality, value, and marketability.

Severity of the erosion hazard is based on the practices needed in managed woodland. The hazard is *slight* if no special practices are needed; *moderate*, if some practices are needed, for example, constructing and maintaining roads, skid trails, and fire lanes; and *severe* if special practices are needed.

The severity of the equipment limitation is based on soil characteristics and topographic features that restrict the use of conventional equipment. Slope, wetness, rough terrain, unfavorable texture, and stones or rocks are the limiting factors. *Slight* means that there is no restriction in the use of equipment; *moderate*, that not all kinds of equipment can be used because of seasonal wetness or instability; and *severe*, that special equipment is needed, and the use of such equipment is restricted by soil texture or seasonal wetness.

Seedling mortality refers to the expected loss of naturally occurring or planted seedlings, as influenced by kinds of unfavorable soil characteristics, not as a result of plant competition. The mortality is *slight* if seedling survival is more than 75 percent, natural regeneration is suitable, or an original planting may be expected to provide a satisfactory stand. Mortality is *moderate* if the survival is 50 to 75 percent, natural regeneration cannot be relied on, and restocking and replanting are necessary. Mortality is *severe* if the survival is less than 50 percent; superior planting, good planting stock, and replanting are necessary.

Use of the Soils for Cultivated Crops and Pasture [4]

This section explains the system of capability grouping used by the Soil Conservation Service, describes the soils in each capability unit, and suggests management suited to the soils in each unit. This section also gives estimated yields per acre of the main crops and grasses on all the soils in the survey area, and it describes the management needed to obtain such yields.

Capability Grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The groups are

[4] JOHN B. HUNGERFORD, conservation agronomist, Soil Conservation Service, assisted with this section.

417-141—73——5

TABLE 6.—*Woodland groups and wood crops*

Woodland suitability group	Potential productivity		Species suitable for planting
	Tree species	Site index class	
Group 1o7: Sta, Toe. Soils on which potential productivity is very high, management hazards are not serious, and broadleaf and needleleaf trees are suitable.	Black walnut Cottonwood Green ash Loblolly pine Shortleaf pine Sweetgum Sycamore Water oak Yellow-poplar	100 110 90 90 80 100 90 90 110	Loblolly pine, cherrybark oak, cottonwood, sweetgum, sycamore, black walnut, yellow-poplar.
Group 1w9: Wht. Excessively wet soils on which potential productivity is very high, equipment limitations are severe, seedling mortality is moderate or severe, and needleleaf and broadleaf trees are suited.	Cottonwood Green ash Loblolly pine Sweetgum Sycamore Water oak White ash Yellow-poplar	90 100 100 90 90 90 90 100	Cherrybark oak, cottonwood, green ash, sweetgum, sycamore, loblolly pine, yellow-poplar.
Group 2o7: HIB, HIC, PcD, T1B, T1C. Soils on which potential productivity is high, management hazards are not serious, and hardwoods, pines, or other conifers are well suited.	Loblolly pine Shortleaf pine White pine Upland oak Yellow-poplar	80–90 70–80 90 70–80 100+	Northern red oak, loblolly pine, shortleaf pine, white pine, black walnut, yellow-poplar, sycamore.
Group 2r8: HIE, T1E. Soils on which productivity is high, equipment limitations and the erosion hazard are moderate, and hardwoods, pines, or other conifers are well suited.	Loblolly pine Shortleaf pine Virginia pine White pine Upland oaks Yellow-poplar	80–90 70–80 70–80 90 70–80 100+	Northern red oak, loblolly pine, shortleaf pine, white pine, black walnut, yellow-poplar.
Group 2s8: Bfs. Sandy soil on which productivity is high, equipment limitations and seedling mortality are moderate, and needleleaf and broadleaf trees are suited.	Cottonwood Sycamore Sweetgum	100 90 90	Sycamore, loblolly pine, yellow-poplar, red oak.
Group 2c2: HJC3, HJE3. Soils on which productivity is high, equipment limitations and erosion hazards are moderate, seedling mortality is slight to moderate because of the high clay content in the subsoil, and pines are best suited.	Loblolly pine Shortleaf pine Virginia pine White pine	80–90 70+ 70–80 90	Loblolly pine, Virginia pine, white pine.
Group 2w8: Afs, Ajc, Chc, HYC, Wks. Seasonally wet soils on which productivity is high, equipment limitations are moderate, seedling mortality is slight to moderate, and needleleaf and broadleaf trees are suitable.	Loblolly pine Sweetgum Yellow-poplar Red oak White oak Sycamore	90 90 100 80 80 90	Loblolly pine, sweetgum, sycamore, yellow-poplar, cottonwood.
Group 2x8: TmE. Soil on which productivity is high, equipment limitations are moderate, the erosion hazard is moderate, and hardwoods, pines, or other conifers are suited.	Loblolly pine Shortleaf pine Virginia pine White pine Upland oak Yellow-poplar	80–90 70 70–80 90 70–80 100+	Northern red oak, loblolly pine, shortleaf pine, white pine, yellow-poplar.
Group 3o7: AmB2, AmC2, AmD2, GdB2, GgB2, GgC2, GiB, GiC2, GiD, HSB, HSC, MiC2, MjB, MjC, MjD, MoA, MoB, MoC2, MpC, MyD2, WgB, WgC2. Soils on which productivity is moderately high, management hazards are not serious, and broadleaf and needleleaf trees are suited.	Loblolly pine Shortleaf pine Red oak White oak Yellow-poplar Virginia pine	80 70 70–80 70–80 90 70+	Loblolly pine, yellow-poplar, white pine, red oak, sycamore.

TABLE 6.—*Woodland groups and wood crops*—Continued

Woodland suitability group	Potential productivity		Species suitable for planting
	Tree species	Site index class	
Group 3r2: TRE. Soil on which productivity is moderately high, equipment limitations and erosion hazard are moderate, and pines or other conifers are best suited.	Loblolly pine Shortleaf pine Virginia pine White pine	80 60–70 70 80+	Loblolly pine, shortleaf pine, Virginia pine, white pine.
Group 3r3: TRF. Soil on which the productivity is moderately high, equipment limitations and erosion hazard are moderate, and pines or other conifers are well suited.	Loblolly pine Shortleaf pine Virginia pine White pine	80 60–70 70 80+	Loblolly pine, shortleaf pine, Virginia pine, white pine.
Group 3r8: GgE2, WgE2. Moderately steep to steep soils on which productivity is moderately high, equipment limitations are moderate, the erosion hazard is moderate, and broadleaf and needleleaf trees are suited.	Loblolly pine Shortleaf pine Yellow-popular Red oak White oak Virginia pine	80 70 90 70–80 70–80 70+	Loblolly pine, yellow-poplar, northern red oak, white pine, Virginia pine.
Group 3x2: AEE, DtD, DuE. Soils on which productivity is moderately high, equipment limitations are moderate, the erosion hazard on slopes greater than 15 percent is moderate, and pines or other conifers are best suited.	Loblolly pine Shortleaf pine Virginia pine White pine	80 60–70 70 80+	Loblolly pine, shortleaf pine, Virginia pine, white pine.
Group 3x3: AcG, AEF, DuF, TeG. Soils on which productivity is moderately high, equipment limitations and the erosion hazard are severe, and pines or other conifers are best suited.	Loblolly pine Shortleaf pine Virginia pine White pine	80 60–70 70 80+	
Group 4f3: MCE. Cobbly soil on which productivity is moderate, the erosion hazard and equipment limitations are slight to moderate, seedling mortality is moderate to severe, and needleleaf trees are suited.	Loblolly pine Virginia pine Shortleaf pine	70 60 60	Loblolly pine, Virginia pine.
Group 4c2: HTD3, GdD3, GdE3, WnC3, WnE3. Severely eroded soils on which productivity is moderate, the erosion hazard and equipment limitations are moderate, seedling mortality is slight to moderate, and needleleaf trees are suited.	Loblolly pine Virginia pine Shortleaf pine Red oak White oak	70 60 60 70 60	Loblolly pine, Virginia pine.
Group 4o1: TcD, WpD. Soils on which productivity is moderate, management hazards are not serious, and needleleaf trees are best suited.	Loblolly pine Shortleaf pine Virginia pine Red oak White oak Yellow-poplar	70 60 60 70 70 80	Loblolly pine, eastern redcedar, Virginia pine.
Group 4r2: TbE, TcE, ThE2. Moderately steep to steep soils on which productivity is moderate, the erosion hazard and equipment limitations are moderate, and needleleaf trees are best suited.	Loblolly pine Shortleaf pine Virginia pine Red oak White oak	70 60 60 70 70	Loblolly pine, Virginia pine, eastern redcedar.
Group 4r3: TbF, TjF. Very steep soils on which productivity is moderate, the erosion hazard and equipment limitations are severe, and needleleaf trees are best suited.	Loblolly pine Shortleaf pine Virginia pine Red oak White oak	70 60 60 70 70	Loblolly pine, Virginia pine.

made according to the limitations of the soils when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for range, for forest trees, or for engineering.

In the capability system, all kinds of soil are grouped at three levels, the capability class, the subclass, and the unit. These are discussed in the following paragraphs.

Capability Classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture or range, woodland, or wildlife habitat.

Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife habitat.

Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife habitat.

Class VIII soils and landforms have limitations that preclude their use for commercial crop production and restrict their use to recreation, wildlife habitat, or water supply, or to esthetic purposes.

Capability Subclasses are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture or range, woodland, wildlife habitat, or recreation.

Capability Units are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe–2 or IIIe–4. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass.

Capability unit numbers generally are assigned locally but are part of a statewide system. All of the units in the system are not represented by the soils of the survey area; therefore, the numbers are not consecutive.

Management by capability units

In the following pages, the capability units in Cherokee, Gilmer, and Pickens Counties are described and suggestions are given for use and management of the soils.

The names of soil series represented in a capability unit are named in the description of the capability unit, but this does not mean that all the soils of a given series appear in the unit. Refer to the "Guide to Mapping Units" at the back of this survey to find the names of all of the soils in any given unit.

CAPABILITY UNIT I–1

The one soil in this unit, Starr fine sandy loam, is a well-drained soil that formed in deposits of alluvium. It is in depressions, around the heads of streams, and on bottom land. The surface layer is very friable fine sandy loam about 9 inches thick. The subsoil is mostly friable loam.

This soil is medium acid to strongly acid. Natural fertility is moderate, and the organic-matter content is moderately low. Tilth is good, and plant roots penetrate effectively to a depth of 36 inches or more. Infiltration and permeability are moderately rapid, and the available water capacity is high.

Most of the acreage is cultivated or pastured; the rest is wooded.

This soil is suited to all crops grown locally, including grasses and legumes. It is especially well suited to home gardens, apple orchards, and truck crops and can be cultivated intensively. Sprinkler irrigation is suitable. Crops are easy to establish and to maintain, and the response to management is good. Erosion is a slight hazard. A suitable cropping system is corn grown each year. Crop residue should be left on the surface after the corn is harvested.

CAPABILITY UNIT I–2

The one soil in this unit, Masada fine sandy loam, 0 to 2 percent slopes, is a well-drained soil on terraces along the major streams. The surface layer is very friable fine sandy loam 9 to 12 inches thick. The subsoil is friable or firm clay loam or sandy clay loam.

This soil is low to moderate in natural fertility, low in content of organic matter, and strongly acid. Water moves into and through the soil at a moderate rate, and the available water capacity is medium. Tilth generally is good, and the root zone is deep.

About half the acreage is cultivated or pastured; the rest is mostly wooded. Some of the more important crops on this Masada soil are small grain, corn, and soybeans. Apples, truck crops, and nursery crops are also suitable. Suitable plants for hay and pasture are Coastal bermudagrass, common bermudagrass, tall fescue, orchardgrass, ryegrass, sorghum, crimson clover, sericea lespedeza, and millet.

This soil has few limitations to use for crops. It can be cropped intensively if well managed. It can be worked throughout a fairly wide range of moisture content but becomes cloddy if plowed when wet. When dry, the surface layer hardens and forms a crust. Good management includes fertilization and other practices for maintaining fertility and tilth. Sprinkler irrigation is suitable. An example of a suitable cropping system is corn grown each year. The residue is mowed, chopped, or disked and left on or near the surface through the winter.

CAPABILITY UNIT IIe-1

This unit consists of well-drained soils of the Gwinnett, Hiwassee, Madison, Tusquitee, and Wickham series. These soils are on uplands, on stream terraces, and in local colluvial depressions. Most areas are slightly eroded or eroded. Slopes range from 2 to 6 percent. The surface layer is friable to very friable loam, sandy clay loam, or fine sandy loam 4 to 12 inches thick. The subsoil is sandy clay loam, clay loam, or clay.

These soils are medium acid to very strongly acid. Natural fertility is low to high, and the content of organic matter is low to moderate. Plant roots penetrate effectively to a depth of 36 inches or more. Infiltration and permeability generally are moderate to moderately rapid, and the available water capacity is medium to high. Tilth is good in all but Gwinnett soils. Gwinnett soils have only fair tilth; they become cloddy when dry.

The soils are suited to all crops grown locally, including grasses and legumes. About half the acreage is cultivated or pastured. Some parts are wooded, some are idle, and others are used as residential or industrial sites. Crops are easy to establish and maintain, and the response to management is good. Because of a slight to moderate hazard of further erosion, clean-cultivated crops should not be grown continuously.

These soils should be managed in such a way that losses from erosion are held within allowable limits in cultivated areas. A suitable cropping system is needed. Steepness and length of slope and practices that control erosion govern the choice of the system used. An example of a suitable cropping system on a terraced slope of 3 percent is 1 year of row crops followed by 1 year of small grain.

CAPABILITY UNIT IIe-2

This unit consists of well-drained, slightly eroded to eroded soils of the Appling, Grover, Hayesville, and Masada series. These soils are on uplands and stream terraces. Slopes are 2 to 6 percent. The surface layer is very friable fine sandy loam and sandy loam 6 to 8 inches thick. The subsoil is mainly sandy clay loam to clay.

These soils are slightly acid to very strongly acid. Natural fertility is low to moderate, and the content of organic matter is low. Tilth is good, and roots of plants can penetrate to a depth of 36 inches or more. Permeability is moderate, and the available water capacity is medium.

About half the acreage is cultivated or pastured. Some parts are wooded, some are idle, and others are used as residential or industrial sites. Most locally grown crops, such as corn, millet, lespedeza, fescue, and other grasses and legumes, are well suited. The response to management is good. Crops are easy to establish and maintain, even though the soils warm up more slowly in spring than those in capability unit IIe-1. Because of the slight to moderate erosion hazard, clean-cultivated crops should not be grown continuously.

Soil losses can be held within allowable limits by using a cropping system and practices that control erosion. The cropping system should include close-growing annuals or perennials or crops that leave large amounts of residue. An example of a suitable cropping system on a 3 percent slope is a row crop and a small grain planted in alternate parallel strips on the contour and rotated each year. Adequate fertilizer and lime are needed, and all residue should be left on the soil.

CAPABILITY UNIT IIw-2

The only soils in this unit are in the Toccoa complex. They are nearly level, well-drained soils on first bottoms. The surface layer varies in texture but commonly is sandy loam or fine sandy loam. It is underlain chiefly by stratified fine sandy loam and loam.

These soils are slightly acid to medium acid. They are moderate to low in natural fertility and organic-matter content. Tilth is good; plant roots can penetrate effectively to a depth of 30 inches or more. Runoff is slow, water moves into and through the soil at a moderately rapid rate, and the available water capacity is medium.

About 75 percent of the acreage is cultivated or pastured. The response to management is good, especially to applications of fertilizer.

These soils are not usually subject to erosion, but they are subject to occasional flooding for short periods. Cropping systems that help in maintaining the organic-matter content and improving soil structure are needed. Corn can be grown continuously if adequate amounts of fertilizer and lime are applied and all crop residue is left on the soil.

CAPABILITY UNIT IIIe-1

This unit consists of well-drained, slightly eroded to eroded soils of the Gwinnett, Hiwassee, Madison, Tusquitee, and Wickham series. These soils are on uplands, on stream terraces, in coves, on benches, and at the base of slopes. Slopes range from 2 to 10 percent. The surface layer is loam, fine sandy loam, or gravelly sandy clay loam 5 to 12 inches thick. The subsoil ranges mainly from sandy clay loam or clay loam to clay.

These soils are low to high in natural fertility, contain moderate to small amounts of organic matter, and are medium acid to very strongly acid. Roots can penetrate effectively to a depth of 40 inches or more. Water moves into and through the soils at a moderate to moderately rapid rate, and the available water capacity is medium to high.

All soils in this unit have good tilth except Madison gravelly sandy clay loam. This soil can be tilled within only a narrow range of moisture content; otherwise, clods form in the surface layer.

Less than half the acreage is in crops and pasture; the rest is wooded or is used for other purposes. The soils are suited to scuppernongs, apples, truck crops, and similar specialty crops, and to all other crops commonly grown. The response to fertilization is good.

Erosion is the chief hazard in cultivated areas. Contour farming, terracing, and regular applications of fertilizer and lime are practices that help keep soil losses within acceptable limits. Close-growing crops should be included in the cropping system; all crop residue should be left on the soil. Steepness and length of slope govern the choice of the cropping system and the practices needed in controlling erosion. A suitable cropping system on a terraced slope of 5 percent is 1 year of any suitable row crop followed by 2 years of small grain and lespedeza.

CAPABILITY UNIT IIIe-2

This unit consists of well-drained, slightly eroded and eroded soils of the Appling, Grover, Hayesville, and Masada series. The surface layer is sandy loam or fine sandy loam to gravelly loam about 4 to 10 inches thick. The subsoil is sandy clay loam to sandy clay.

These soils are slightly acid to very strongly acid, are low to moderate in natural fertility, and contain small amounts of organic matter. Plant roots can penetrate effectively to a depth of 32 inches or more. Water movement through the soil is moderate, and the available water capacity is medium. Tilth is generally good; it is poor in eroded areas. The gravel in the surface layer slightly inhibits tillage.

Less than half the acreage is used for crops and pasture; the rest is wooded or is used as residential or industrial sites. If fertility and the organic-matter content are maintained, the soils are suited to scuppernongs, apples, truck crops, and other specialty crops and to most of the other crops locally grown. They are not suited to alfalfa.

A complete drainage system and practices for controlling erosion and maintaining fertility are needed. Steepness and length of slope govern the choice of the cropping system and the practices needed to hold losses of soil and water within allowable limits. A suitable cropping system on an 8 percent slope 150 feet long is a row crop and a grass crop planted in alternate strips on the contour and rotated every 2 years.

CAPABILITY UNIT IIIe-4

The one soil in this capability unit, Helena sandy loam, 2 to 10 percent slopes, is a moderately well drained soil on uplands. The surface layer is friable sandy loam about 6 inches thick. The subsoil ranges from sandy clay to clay and extends to a depth of about 30 to 46 inches. The depth to the seasonal high water table is about 15 inches.

This soil is strongly acid to very strongly acid. Natural fertility and the content of organic matter are low. Tilth generally is good. Permeability is slow, and the available water capacity is medium.

About half the acreage is cultivated and pastured; the rest is wooded or idle. The soil is moderately well suited to most of the crops locally grown and is well suited to supplemental summer pasture and permanent pasture. Generally, it is not suited to alfalfa, wheat, and barley. The response to fertilization is fairly good.

Soil losses can be held within allowable limits by using practices that control erosion and a cropping system that provides close-growing crops or crops that leave large amounts of residue. A suitable cropping system on a terraced slope of 3 percent is 1 year of a row crop followed by 2 years of small grain or lespedeza.

CAPABILITY UNIT IIIs-1

The one soil in this unit, Buncombe loamy sand, is an excessively drained soil on flood plains. It is subject to flooding. Slopes are 0 to 2 percent. The surface layer is very friable loamy sand 6 to 12 inches thick. Below this, to a depth of about 56 inches, is very friable to loose loamy sand.

This soil is very strongly acid. It has good tilth, and plant roots can penetrate to a depth of 48 inches or more. The content of organic matter and natural fertility are low. Permeability is rapid, and the available water capacity is low. Erosion is not a hazard.

This soil is droughty. It is fairly well suited to Coastal bermudagrass and other perennial plants, but it is not suited to corn, grain sorghum, oats, rye, annual lespedeza, crimson clover, and sericea lespedeza, and is generally not suited to cotton, wheat, alfalfa, or white clover. Fertilizer improves the growth of crops and pasture plants, but the effects of the fertilizer do not last long. Practices that help in maintaining the content of organic matter and the moisture supply are needed. Keeping all crop residue on the surface between cropping seasons and on or near the surface during crop growth is helpful. A suitable cropping system is 2 years or more of Coastal bermudagrass followed by 1 year of corn or grain sorghum.

CAPABILITY UNIT IIIw-2

This unit consists of Alluvial land, cobbly, and well-drained and somewhat poorly drained soils of the Cartecay and Chewacla series. All are on flood plains. Slopes are 0 to 2 percent. The surface layer is 8 or 9 inches thick. It is chiefly loam but in some areas is coarse sandy loam to silt loam. The underlying layers are mostly loamy.

These soils are strongly acid to medium acid. Natural fertility is moderately high to low, and the content of organic matter is moderate to low. Except for Alluvial land, cobbly, tilth is good. Permeability is moderate to moderately rapid. The available water capacity is medium to high in Cartecay and Chewacla soils but is variable in Alluvial land, cobbly.

More than half the acreage is wooded; the rest is cultivated. The soils are suited to corn and grain sorghum and are well suited to tall fescue, orchardgrass, bermudagrass, annual lespedeza, and white clover. They are not suited to cotton, wheat, alfalfa, sericea lespedeza, kudzu, or crimson clover. Generally, sprinkler irrigation is suitable. Nearby streams are a good source of water.

Row crops can be grown continuously if flooding is controlled and crop residue is used to maintain good tilth. The response to fertilizer is good. Both lime and a complete fertilizer are needed.

Overflow from streams is the main hazard in cultivated areas. A drainage system is needed to remove excess surface water.

CAPABILITY UNIT IIIw-3

The one soil in this capability unit, Augusta fine sandy loam, is somewhat poorly drained. It occurs on low stream terraces and round the heads of drainageways. Slopes are 0 to 2 percent. The surface layer generally is very friable fine sandy loam about 8 inches thick. The subsoil is mainly mottled sandy clay loam to clay loam and extends to a depth of about 48 inches.

This soil is very strongly acid to strongly acid. Natural fertility and the organic-matter content are low. Tilth is good. Plant roots can penetrate effectively to a depth of about 22 to 30 inches. Runoff is slow, permeability is moderate, and the available water capacity is medium.

Most of the acreage is pastured. This soil is suited to tall fescue, orchardgrass, and white clover. It is moderately well suited to corn, grain sorghum, bermudagrass, soybeans, annual lespedeza, and sericea lespedeza. Generally, it is not suited to cotton, wheat, alfalfa, oats, or kudzu. Other crops fail in some years because of wetness. The response to fertilizer is good.

Excess surface water, somewhat poor internal drainage, and flooding are the chief limitations. A supplemental drainage system is needed to carry off the excess surface water.

An example of a suitable cropping system is 1 year of a row crop followed by 2 years of grass. Turning under cover crops and including a suitable perennial in the cropping system help in maintaining the supply of organic matter and preserving tilth in areas used intensively for row crops. If annual crops are grown, all residue should be kept on the surface between cropping seasons. Most crops need regular applications of lime and a complete fertilizer. Legumes need nitrogen only at the time of planting.

CAPABILITY UNIT IVe-1

This unit consists of well-drained, slightly eroded to severely eroded soils of the Appling, Grover, Gwinnett, Hayesville, Hiwassee, Madison, Masada, Porters, and Wickham series. These soils are on uplands, on stream terraces, in coves, on benches, and at the base of slopes. Slopes range from 2 to 15 percent. The surface layer is loamy and about 3 to 12 inches thick; the subsoil ranges mainly from sandy clay loam to clay.

These soils are medium acid to very strongly acid. The natural fertility and the organic-matter content are low to moderate. Tilth is good in the Appling, Grover, Madison, and Porters soils but is fair to poor in the rest. The severely eroded soils can be cultivated within only a narrow range of moisture content; otherwise, clods form. Permeability is moderate to moderately rapid, and the available water capacity is medium to high. Runoff is moderately rapid to rapid in cultivated areas. Plant roots can penetrate effectively to a depth of 36 inches or more.

Generally, these soils are suited to most crops grown locally but are better suited to grasses and legumes than to row crops. Most of the acreage is woodland or is used for pasture. In some areas row crops can be grown if they are rotated with perennial crops.

Erosion is the chief hazard in cultivated areas. Contour farming, terracing, grassed waterways, and stripcropping help in controlling erosion. Close-growing crops should be included in the cropping system. Regular applications of lime and fertilizer are needed. An example of a suitable cropping system on a soil that has an 8 percent slope is 3 years of grass followed by 1 year of corn. All planting should be done on the contour.

CAPABILITY UNIT IVw-1

Wehadkee loam, the one soil in this unit, is a poorly drained, frequently flooded soil on flood plains. Slopes are 0 to 2 percent. The surface layer is mainly loam about 10 inches thick. The subsoil is mottled loam and sandy clay loam.

This soil is slightly acid to medium acid. Natural fertility and the content of organic matter are low. Tilth is poor. The seasonal high water table generally is near the surface for long periods, and the depth to which plant roots penetrate is inhibited unless the soil is drained. Runoff is slow to ponded. Permeability is moderate, and the available water capacity is medium.

This soil is mainly woodland, but it is suited to white clover, annual lespedeza, tall fescue, dallisgrass, and orchardgrass. Unless drained, it is not suited to many other crops locally grown. Corn can be grown continuously in drained areas. Flooding and wetness are the chief hazards. Besides drainage, regular applications of lime and fertilizer are needed. The response to fertilizer is mainly good.

CAPABILITY UNIT Vw-1

The one soil in this unit, Worsham fine sandy loam, is a poorly drained soil in depressions, near the heads of streams, and along the base of slopes of fairly broad stream terraces. Slopes are 0 to 2 percent. The surface layer is fine sandy loam 5 to 8 inches thick. The subsoil is chiefly mottled sandy clay loam and clay.

This soil is strongly acid to very strongly acid. Natural fertility and the content of organic matter are low. Permeability is moderately slow or very slow. The water table commonly is near the surface for long periods. Consequently, the depth to which plant roots penetrate is inhibited. Runoff is slow to ponded, and the available water capacity is medium to high.

This Worsham soil is too wet to be cultivated, but it is suited to a few pasture plants and to trees. It is fairly well suited to annual lespedeza, tall fescue, white clover, and dallisgrass. Regular applications of lime and fertilizer are needed in pastured areas. Most of the acreage is wooded.

Excess surface water, flooding, and slow internal drainage are the main limitations. Subsurface drainage is not feasible in many areas because of the slow lateral movement of water.

CAPABILITY UNIT VIe-1

This unit consists of well-drained, slightly eroded soils of the Hayesville and Tusquitee series. These soils are on uplands, in coves, and at the base of slopes. Slopes range from 10 to 25 percent. The surface layer is very friable loam and fine sandy loam about 5 to 8 inches thick. The subsoil is mainly clay loam and clay.

These soils are strongly acid. Natural fertility is low to high, and the content of organic matter is moderate to low. Plant roots generally can penetrate effectively to a depth of 36 inches or more. Permeability is moderate to moderately rapid, and the available water capacity is medium to high. Tilth generally is good.

Some of the acreage has been cultivated, but most of it is now wooded. Steep slopes and the severe hazard of further erosion make these soils unsuited for cultivated crops. All of the common grasses and legumes but alfalfa can be grown, but they are somewhat difficult to establish. Pasture plants or hay crops can be established in places where tillage and planting are on the contour. If replanting must be done, seeding pasture plants and hay crops in alternate strips helps in controlling erosion. Weakening the plant cover can be avoided by controlled grazing. Both lime and fertilizer are needed.

CAPABILITY UNIT VIe-2

In this unit are well-drained, eroded to severely eroded soils of the Gwinnett and Wickham series. These soils are on side slopes that range from 10 to 25 percent. Their surface layer is fine sandy loam, loam, and sandy clay loam 4 to 12 inches thick. Their subsoil is mainly clay or sandy clay loam.

Natural fertility and the organic-matter content are low. Permeability is moderate, and the available water capacity is medium. Roots can penetrate effectively to a depth of about 24 inches. Tilth generally is good; it is only fair in the severely eroded Gwinnett soils, which become cloddy unless plowed when the moisture content is optimum.

These soils are not suited to row crops because the erosion hazard is very severe in cultivated areas. They are suited to trees and pasture plants and to all the common grasses and legumes, such as tall fescue, bermudagrass, orchardgrass, sericea lespedeza, white clover, and annual lespedeza.

Good management, including weed control and applications of lime and fertilizer in amounts determined by soil tests, is needed in establishing pasture. No plowing should be done except when reseeding pasture; all plowing should be done on the contour. Grazing should be carefully controlled; sheet and gully erosion commonly occur in the overgrazed areas.

CAPABILITY UNIT VIe-3

This unit consists mainly of well-drained, flaggy and cobbly upland soils. These soils are in the Dekalb, Tallapoosa, and Wilkes series. Slopes range from 5 to 15 percent. The surface layer is chiefly fine sandy loam, about 5 inches thick, and contains coarse fragments. The subsoil is mainly sandy loam, sandy clay loam, silty clay loam, and clay.

These soils are very strongly acid to medium acid. Natural fertility and the content of organic matter are low. Plant roots can penetrate effectively to a depth of about 8 to 24 inches. Permeability is rapid to moderately slow. The available water capacity is low to medium.

The severe erosion hazard, the coarse fragments, and the shallowness over rock make these soils unsuitable for cultivation and better suited to pine trees and to grazing. Pasture can be established, but fragments interfere with mowing. Bermudagrass and sericea lespedeza grow fairly well.

Placing logging roads and firebreaks on the contour and conducting all other woodland operations on the contour are ways of controlling erosion in woodland.

CAPABILITY UNIT VIIe-1

This unit consists of well-drained, severely eroded soils of the Hayesville and Wickham series. These soils are on uplands and high terraces. Slopes range from 10 to 25 percent. The surface layer is sandy clay loam about 3 to 6 inches thick. The subsoil ranges from sandy clay loam to clay.

The soils in this unit are strongly acid to very strongly acid. Natural fertility and the content of organic matter are low. Tilth generally is poor. Plant roots can penetrate effectively to a depth of about 22 inches. Permeability is moderate, and the available water capacity is medium. Runoff is rapid to very rapid.

Much of the acreage has been cultivated but is now mostly wooded. Steep slopes and the severe erosion hazard make these soils unsuitable for cultivation. Shortleaf and loblolly pines grow well. Placing logging roads and firebreaks on the contour and conducting all other wood operations on the contour are ways of controlling erosion.

CAPABILITY UNIT VIIe-2

This unit consists of well-drained to somewhat excessively drained, slightly eroded to eroded soils of the Musella and Tallapoosa series. These soils are on uplands. Slopes range from 10 to 25 percent. The surface layer is gravelly sandy clay loam, fine sandy loam, and cobbly loam about 4 to 6 inches thick. The subsoil is silty clay loam and cobbly and gravelly clay loam.

These soils are medium acid to very strongly acid. Natural fertility and the content of organic matter are low. Permeability is moderate, the available water capacity is medium to low, and runoff is moderately rapid to rapid.

Steep slopes, the many pebbles and cobblestones in the surface layer, and the severe erosion hazard make these soils unsuitable for cultivation. Shortleaf and loblolly pines grow well. Placing logging roads and firebreaks on the contour and conducting all other operations on the contour are suitable ways of controlling erosion.

CAPABILITY UNIT VIIe-3

This unit consists of well-drained soils of the Dekalb series. These soils are on uplands, on ridgetops and long side slopes. Slopes range from 15 to 60 percent. The surface layer is stony and cobbly fine sandy loam, about 5 inches thick. The subsoil is fine sandy loam and sandy loam in most areas and is stony and cobbly throughout.

These soils are very strongly acid. Natural fertility and the content of organic matter are low. Plant roots can penetrate to a depth of about 2 to 5 feet. The available water capacity is low to medium, depending on the number of stony fragments and the depth to bedrock. Permeability is rapid.

Most of the acreage is woodland. Because of steep slopes and coarse fragments, these soils are not suited to cultivated crops or pasture. They are suited to trees of mixed hardwoods and shortleaf and loblolly pine. Placing logging roads and firebreaks on the contour and conducting other woodland operations on the contour are ways of controlling erosion.

CAPABILITY UNIT VIIs-1

This unit consists of cobbly, flaggy, stony, and channery soils of the Ashe, Edneyville, Talladega, Tallapoosa, and Tusquitee series. These soils are well drained to somewhat excessively drained. They are generally on sharp ridgetops, long mountain side slopes, and escarpments. The surface layer ranges from loam to sandy loam. The subsoil ranges from loam to silty clay loam and generally contains coarse fragments. Depth to hard rock is commonly

2 to more than 10 feet. Rock outcrops and boulders occur in places.

The available water capacity is low to high, and permeability is moderately rapid to moderate. Natural fertility is low to high. The organic-matter content is low to moderate.

Because of the steep slopes and numerous rock fragments, these soils are not suited to cultivated crops or pasture. They are best suited to woodland, mainly to shortleaf and loblolly pines. Placing logging roads and firebreaks on the contour and conducting all other woodland operations on the contour are suitable ways of controlling erosion.

CAPABILITY UNIT VIIIs-1

One land type, Rock land, is in this unit. Hard rock is at or near the surface. Rock land has no value for farming. In places it is a source of crushed stone. Some areas can be developed for recreational uses. Care and skill are needed in establishing and maintaining any vegetation.

Estimated Yields

Table 7 gives estimated yields of the principal crops, under high level management, on the arable soils of the survey area. The estimates are based on records of actual yields on individual farms, on yields obtained in long-term experiments, and on estimates made by agronomists who have had experience with crops and the soils.

Generally, the management needed to obtain the yields shown in table 7 is described in the section "Management by Capability Units." Special practices for particular crops are as follows:

Corn: Apply 100 to 150 pounds of nitrogen (N) per acre, 60 to 70 pounds phosphoric acid (P_2O_5), and 60 to 90 pounds of potash (K_2O); plant enough seed to produce 12,000 to 15,000 plants per acre; turn under all crop residue, or grow a winter cover crop and turn it under.

Cotton: Apply 60 to 120 pounds of nitrogen (N), 50 to 80 pounds of phosphoric acid (P_2O_5) and 75 to 120 pounds potash (K_2O) per acre; plant enough seed per acre to produce 25,000 to 40,000 plants; provide effective insect control.

Oats: Apply 20 to 30 pounds of nitrogen (N), 40 to 60 pounds each of phosphoric acid (P_2O_5) and potash (K_2O) per acre at time of planting; apply 40 to 60 pounds of nitrogen per acre late in winter; provide adequate control of plant diseases.

TABLE 7.—*Estimated yields per acre of principal crops under high level management*

[Yields are for dryland soils. Absence of figure indicates the crop is not commonly grown on the soil specified]

Soil	Corn [1]	Cotton (lint)	Oats	Grain sorghum	Hay			Improved pasture [2]
					Sericea lespedeza	Coastal bermudagrass	Tall fescue	
	Bu.	*Lb.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*A.U.M.* [3]
Alluvial land, cobbly	85							6.0
Appling sandy loam, 2 to 6 percent slopes, eroded	80	625	75	50	3.0	5.0	3.7	6.2
Appling sandy loam, 6 to 10 percent slopes, eroded	75		70	45	2.6	4.5	3.1	5.2
Appling sandy loam, 10 to 15 percent slopes, eroded					2.2	3.5	2.6	4.3
Augusta fine sandy loam	65		55	50		3.5	3.6	6.0
Buncombe loamy sand			45	30	1.7	4.5		
Chewacla-Cartecay complex	85			65		4.0	4.0	6.7
DeKalb flaggy fine sandy loam, 6 to 15 percent slopes					1.3		1.5	2.0
Grover fine sandy loam, 2 to 6 percent slopes	65	600	70	45	2.8	4.0	3.5	5.3
Grover fine sandy loam, 6 to 10 percent slopes, eroded	50		60	35	2.5	3.5	3.0	5.0
Grover fine sandy loam, 10 to 15 percent slopes					1.6	3.0	2.5	4.0
Gwinnett loam, 2 to 6 percent slopes, eroded	80	625	70	60	2.5	5.0	3.5	5.8
Gwinnett loam, 6 to 10 percent slopes, eroded	75		65	55	2.0	4.5	3.1	5.2
Gwinnett loam, 10 to 25 percent slopes, eroded					1.5		2.4	4.0
Gwinnett sandy clay loam, 2 to 6 percent slopes, eroded	65	425	58	42	1.5	4.5	2.9	4.8
Gwinnett sandy clay loam, 6 to 15 percent slopes, severely eroded			40	30	2.2	3.5	2.7	4.5
Gwinnett sandy clay loam, 15 to 25 percent slopes, severely eroded							2.2	3.7
Hayesville fine sandy loam, 2 to 6 percent slopes	80	625	70	50	2.8	4.5	3.4	5.7
Hayesville fine sandy loam, 6 to 10 percent	70	525	60	40	2.6	4.0	3.2	5.3
Hayesville fine sandy loam, 10 to 25 percent slopes					2.4	3.5	2.8	5.0
Hayesville sandy clay loam, 2 to 10 percent slopes, severely eroded			40	30	2.0	3.0	2.4	4.5
Hayesville sandy clay loam, 10 to 25 percent slopes, severely eroded					1.4			
Helena sandy loam, 2 to 10 percent slopes	40		50	40	2.8	4.0	3.4	5.7
Hiwassee loam, 2 to 6 percent slopes	85	525	80	55	3.0	5.0	3.4	5.7
Hiwassee loam, 6 to 10 percent slopes	80		75	48	2.7	4.5	3.3	5.5
Hiwassee clay loam, 6 to 15 percent slopes, severely eroded			45	30	2.0	4.0	3.0	4.8

See footnotes at end of table.

TABLE 7.—*Estimated yields per acre of principal crops under high level management*—Continued

Soil	Corn [1]	Cotton (lint)	Oats	Grain sorghum	Hay: Sericea lespedeza	Hay: Coastal bermudagrass	Hay: Tall fescue	Improved pasture [2]
	Bu.	*Lb.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*A.U.M.* [3]
Madison gravelly sandy clay loam, 2 to 10 percent slopes, eroded	---	---	---	---	---	4.0	2.4	4.8
Madison fine sandy loam, 2 to 6 percent slopes	80	625	75	50	2.7	4.5	3.2	5.8
Madison fine sandy loam, 6 to 10 percent slopes	70	---	65	45	2.5	4.0	3.1	5.5
Madison fine sandy loam, 10 to 15 percent slopes	---	---	---	40	2.0	3.5	2.5	5.0
Masada gravelly loam, 2 to 10 percent slopes	65	500	55	37	2.5	4.0	3.1	5.2
Masada fine sandy loam, 0 to 2 percent slopes	75	450	65	55	3.0	5.5	3.7	6.2
Masada fine sandy loam, 2 to 6 percent slopes	68	625	70	50	3.0	5.0	3.7	6.2
Masada fine sandy loam, 6 to 10 percent slopes, eroded	65	---	60	45	2.6	4.5	3.1	5.2
Masada sandy clay loam, 10 to 15 percent slopes, eroded	---	---	---	---	2.0	3.5	2.8	4.8
Musella cobbly loam, 10 to 25 percent slopes	---	---	---	---	1.5	---	---	2.0
Porters loam, 6 to 15 percent slopes	---	---	---	---	2.0	---	2.5	3.3
Starr fine sandy loam	90	---	80	55	3.1	5.5	4.0	6.6
Tallapoosa fine sandy loam, 6 to 15 percent slopes	---	---	---	---	1.4	3.3	1.8	3.0
Tallapoosa gravelly sandy clay loam, 10 to 25 percent slopes, eroded	---	---	---	---	1.2	---	1.5	2.5
Toccoa complex	90	650	75	65	3.1	4.5	4.2	7.0
Tusquitee stony loam, 10 to 25 percent slopes	---	---	---	---	---	---	---	2.5
Tusquitee loam, 2 to 6 percent slopes	90	---	75	65	3.2	4.5	4.5	7.0
Tusquitee loam, 6 to 10 percent clopes	80	---	65	55	3.0	4.0	4.0	6.0
Tusquitee loam, 10 to 25 percent slopes	---	---	---	---	2.0	3.0	3.0	5.0
Wehadkee loam	---	---	---	---	---	---	3.2	5.3
Wickham fine sandy loam, 2 to 6 percent slopes	80	625	75	50	3.0	5.0	3.6	6.0
Wickham fine sandy loam, 6 to 10 percent slopes, eroded	75	---	70	45	2.6	4.5	3.1	5.2
Wickham fine sandy loam, 10 to 25 percent slopes, eroded	---	---	---	---	2.0	2.5	2.5	4.2
Wickham sandy clay loam, 2 to 10 percent slopes, severely eroded	---	---	40	30	2.0	4.0	2.4	4.0
Wickham sandy clay loam, 10 to 25 percent slopes, severely eroded	---	---	---	---	1.8	---	2.2	3.8
Wilkes complex, 5 to 15 percent slopes	---	---	---	---	1.8	4.0	2.5	4.0
Worsham fine sandy loam	---	---	---	---	---	---	3.1	5.2

[1] For yields of corn in irrigated areas, see Ga. Agr. Expt. Sta. Bul. N.S. 60 (*3*).
[2] Improved pasture is tall fescue and white clover, or common bermudagrass and crimson clover.
[3] Animal-unit month is used to express the amount of forage or feed required to maintain one animal unit for a period of 30 days.

Grain sorghum: Apply 20 to 30 pounds of nitrogen (N), 40 to 60 pounds of phosphoric acid (P_2O_5), and 60 to 90 pounds potash (K_2O) per acre at the time of planting; side dress at the rate of 50 to 120 pounds of nitrogen (N) per acre; provide adequate control of plant diseases.

Sericea lespedeza: Apply 40 to 70 pounds of phosphoric acid (P_2O_5), 60 to 90 pounds potash (K_2O), and 1 ton of lime per acre at the time of seeding; apply 40 to 70 pounds of phosphoric acid (P_2O_5) and 60 to 90 pounds potash (K_2O) per acre annually thereafter; apply 1 ton of lime per acre at least 1 year in 3, or in amounts determined by soil tests.

Coastal bermudagrass: For hay apply 200 to 300 pounds of nitrogen (N), 75 to 100 pounds of phosphoric acid (P_2O_5), and 100 to 150 pounds of potash (K_2O) per acre annually; apply nitrogen in 2 to 4 applications, first early in spring and then after each cutting. For pasture apply 175 to 200 pounds of nitrogen (N), 60 to 70 pounds of phosphoric acid (P_2O_5), and 90 to 105 pounds of potash (K_2O) per acre annually; split applications of nitrogen are needed.

Tall fescue: Apply 100 to 140 pounds of nitrogen (N), 50 to 60 pounds of phosphoric acid (P_2O_5), and 80 to 90 pounds of potash (K_2O) per acre annually.

Improved pasture: Apply 50 to 60 pounds of nitrogen (N), 50 to 60 pounds of phosphoric acid (P_2O_5), and 80 to 90 pounds of potash (K_2O) per acre annually.

Fruits and vegetables: Apples, grapes, and truck crops are important crops in the survey area, especially in parts of Gilmer County. The Hayesville and Madison soils are the principal ones planted to apple orchards. Ordinarily, the colluvial soils and those on terraces and well-drained bottom land are in truck crops. No yields for fruits and vegetables are given in table 7 because of the lack of reliable data.

Use of the Soils for Wildlife Habitat [5]

Successful management of wildlife requires that food, cover, and water be available in a suitable combination.

[5] PAUL D. SCHUMACHER, biologist, Soil Conservation Service, assisted in preparing this section.

The lack of any one of these necessities may severely limit the numbers of wildlife or account for the absence of wildlife species. Information on soils is a valuable tool in creating or improving suitable habitat.

Most wildlife habitat is managed by planting suitable vegetation and by managing the existing vegetation so as to bring about a favorable habitat and to increase the growth of plants. Water areas can be created, or natural ones can be improved.

Table 8 gives the suitability of all the soils in the survey area for elements of wildlife habitat and kinds of wildlife. Elevation, aspect, and other factors of the landscape that influence the habitat were not considered in the ratings listed in table 8. All of these should be appraised onsite.

The suitability ratings shown in table 8 are defined as follows.

Well suited, indicated by numeral 1, means that low intensity management is needed in creating, improving,

TABLE 8.—*Suitability of the soils for elements of wildlife habitat and kinds of wildlife*

[1 means well suited, 2 means suited, 3 means poorly suited, 4 means unsuited]

Soil and map symbol	Elements of wildlife habitat							Kinds of wildlife		
	Grain and seed crops	Grasses and legumes	Herbaceous upland plants	Hardwood woody plants	Coniferous woody plants	Wetland food and cover plants	Shallow water developments	Openland	Woodland	Wetland
Alluvial land:										
Ajc	3	2	2	2	2	2	3	2	2	3
Appling:										
AmB2	1	1	1	2	3	4	3	1	2	4
AmC2	2	2	1	2	3	4	4	2	2	4
AmD2	3	2	2	3	3	4	4	3	3	4
Ashe:										
AcG	4	3	2	2	3	4	4	4	3	4
AEE	3	2	2	2	3	4	4	3	3	4
AEF	4	3	2	2	3	4	4	3	3	4
Augusta:										
Afs	2	1	1	1	3	2	3	2	1	3
Buncombe:										
Bfs	3	3	3	4	1	4	4	3	3	4
Chewacla:										
Chc	2	1	1	1	3	1	2	2	1	1
Dekalb:										
DtD	3	2	1	2	3	4	4	3	2	4
DuE	4	2	2	2	3	4	4	2	2	4
DuF	4	3	2	2	3	4	4	2	3	4
Grover:										
GiB	1	1	1	2	3	4	3	1	2	4
GiC2	2	2	1	2	3	4	4	2	2	4
GiD	3	2	2	2	3	4	4	2	2	4
Gwinnett:										
GgB2	1	1	1	2	3	4	4	1	2	4
GgC2	2	1	2	2	3	4	4	2	2	4
GgE2	4	3	3	3	3	4	4	4	3	4
GdB2	2	2	3	2	3	4	4	3	2	4
GdD3	3	2	2	3	3	4	4	3	3	4
GdE3	4	3	2	3	3	4	4	4	3	4
Hayesville:										
HIB	1	1	1	2	3	4	3	1	2	4
HIC	2	2	2	2	3	4	4	2	2	4
HIE	4	3	3	3	3	4	4	3	3	4
HJC3	3	3	3	3	3	4	4	3	3	4
HJE3	4	3	3	4	3	4	4	4	3	4
Helena:										
HYC	3	1	2	2	3	4	3	2	2	4
Hiwassee:										
HSB	1	1	1	2	3	4	4	1	3	4
HSC	2	1	2	2	3	4	4	2	3	4
HTD3	3	2	2	3	3	4	4	3	3	4

TABLE 8—*Suitability of the soils for elements of wildlife habitat and kinds of wildlife*—Continued

Soil and map symbol	Elements of wildlife habitat							Kinds of wildlife		
	Grain and seed crops	Grasses and legumes	Herbaceous upland plants	Hardwood woody plants	Coniferous woody plants	Wetland food and cover plants	Shallow water developments	Openland	Woodland	Wetland
Madison:										
MiC2	2	1	2	3	3	4	4	2	3	4
MjB	1	1	1	2	3	4	3	1	2	4
MjC	2	1	2	2	3	4	4	2	2	4
MjD	3	2	2	2	3	4	4	3	2	4
Masada:										
MpC	2	1	1	2	3	4	4	2	2	4
MoA	1	1	2	1	3	2	2	2	3	3
MoB	1	1	2	1	3	3	2	2	3	3
MoC2	2	2	1	2	3	4	4	2	2	4
MyD2	3	2	2	2	3	4	4	2	3	4
Musella:										
MCE	4	2	2	2	3	4	4	3	3	4
Porters:										
PcD	3	2	1	1	3	4	4	3	1	4
Rock land:										
Roc	4	4	3	4	4	4	4	4	4	4
Starr:										
Sta	1	1	1	1	3	2	3	1	1	2
Talladega:										
TeG	4	4	2	2	2	4	4	4	2	4
TRE	3	2	2	2	2	4	4	3	2	4
TRF	4	3	2	2	3	4	4	4	2	4
Tallapoosa:										
TbE	3	2	2	2	3	4	4	3	2	4
TbF	4	3	2	2	3	4	3	4	2	4
TjF	4	3	2	2	3	4	3	4	2	4
TcD	3	1	2	2	3	4	3	1	1	4
TcE	3	2	2	2	3	4	3	1	1	4
ThE2	3	2	2	2	3	4	3	1	1	4
Toccoa:										
Toe	2	1	2	1	3	2	3	2	2	3
Tusquitee:										
TmE	4	3	2	2	3	4	4	4	2	4
TlB	1	1	1	1	3	4	4	1	1	4
TlC	2	1	1	1	3	4	4	2	1	4
TlE	3	2	1	1	3	4	4	3	1	4
Wehadkee:										
Wht	3	3	3	1	1	1	1	3	1	1
Wickham:										
WgB	1	1	1	2	3	4	3	1	2	4
WgC2	2	1	2	2	3	4	4	2	2	4
WgE2	3	3	2	2	3	4	4	3	2	4
WnC3	3	3	3	3	2	4	4	3	2	4
WnE3	4	3	3	3	2	4	4	4	3	4
Wilkes:										
WpD	3	2	2	2	2	3	4	2	2	4
Worsham:										
Wks	3	3	3	1	2	1	2	3	1	1

or maintaining the habitat, and satisfactory results are assured.

Suited, indicated by numeral 2, means that moderate intensity management is required for satisfactory results.

Poorly suited, indicated by numeral 3, means that creating, improving, or maintaining habitat is difficult and that intensive effort is needed to obtain satisfactory results.

Unsuited, indicated by numeral 4, means that managing the habitat element is highly impractical if not impossible.

Special attention is given to rating woodland habitat of coniferous woody plants. There is considerable evidence that if growth is slow and canopy closure is delayed, coniferous habitat harbors larger numbers and kinds of wildlife than if growth is rapid. Therefore, soil properties that tend to promote rapid growth and canopy closure are actually limitations. In general, the same soil characteristics that are favorable for the quick establishment and rapid growth of conifers are also favorable for the establishment of hardwoods. Consequently, there is serious competition between the two species.

Elements of wildlife habitat shown in table 8 are defined as follows.

Grain and seed crops: Agricultural grains or seed-producing annuals planted to grow food for wildlife. Examples are corn, sorghum, wheat, oats, millet, soybeans, and proso.

Grasses and legumes: Domestic perennial grasses and herbaceous legumes that are planted and that furnish food and cover for wildlife. Examples are fescue, bromegrass, lovegrass, orchardgrass, reed canarygrass, bahia, white clover, trefoil, alfalfa, and annual lespedeza, perennial lespedeza, and shrub lespedeza.

Wild herbaceous upland plants: Native or introduced perennial grasses and weeds that provide food and cover principally to upland forms of wildlife, and that are established mainly through natural processes. Examples are bluestem, wild ryegrass, catgrass, pokeweed, strawberries, lespedeza, beggarweed, wild beans, nightsbeds, goldenrod, dandelion, cheat, poorjoe, and ragweeds.

Hardwood woody plants: Nonconiferous trees, shrubs, and woody vines that produce fruits, nuts, buds, catkins, or foliage used extensively as food by wildlife, and which commonly are established through natural processes but also may be planted. Examples are oak, beech, cherry, hawthorn, dogwood, viburnum, maple, birch, poplar, grapes, honeysuckle, blueberry, briers, greenbriers, autumn olive, and multiflora rose.

Coniferous woody plants: Cone-bearing trees and shrubs, important to wildlife mainly as cover but also furnish food in the form of browse, seeds, or fruitlike cones; plants commonly are established through natural processes but also may be planted. Examples are pine and redcedar.

Wetland food and cover plants: All annual and perennial, wild herbaceous plants in moist to wet sites, except submerged or floating aquatics, that produce food or cover used by wetland kinds of wildlife. Examples are smartweed, wild millet, bulrush, spike sedge, rushes, sedges, burreeds, wild rice, rice cutgrass, mannagrass, and cattails.

Shallow water developments: Impoundments or excavations for control of water, generally not exceeding 6 feet in depth. Examples are low dikes and levees; shallow dugouts; level ditches; water-level controls in marshy drainageways or channels.

As shown in table 8, there are three classes of wildlife. Openland wildlife includes quail, doves, meadowlark, field sparrow, cottontail rabbit, fox, and other mammals and birds that normally live on cropland, pasture, meadow, lawn, and in other openland areas. Woodland wildlife includes woodcock, thrush, wild turkey, vireo, squirrel, deer, raccoon, and other mammals and birds that normally live in wooded areas where hardwood trees, shrubs, and coniferous trees grow. Wetland wildlife includes ducks, geese, rail, heron, shore birds, mink, and other animals and birds that normally live in wet areas, marshes, and swamps.

Assistance in planting and establishing habitat for wildlife or fish may be obtained from the district conservationist of the Soil Conservation Service.

Formation and Classification of the Soils

This section describes the major factors of soil formation and tells how they have affected the soils of Cherokee, Gilmer, and Pickens Counties. It also defines the current system for classifying soils and shows the classification by series and higher categories.

Formation of Soils

Soil forms through the interaction of major soil-forming factors—parent material, climate, relief, plants and animals, and time. All of these factors affect the formation of each soil, but the relative importance of each factor differs from place to place. In some areas, one factor may dominate in the formation of a soil and determine most of its properties, whereas, in other areas other factors dominate.

The five factors of soil formation are described in the following paragraphs.

Parent material

Parent material is the unconsolidated mass from which a soil develops. It is largely responsible for the chemical and mineralogical composition of a soil. Most soils in this survey area formed in residual material; that is, material weathered from the underlying rock.

According to the Geologic Map of Georgia (*5*), most of the acreage in the three counties is underlain by biotite gneiss, schist, mica, quartzite, phyllite, argillite, and slate. The main residual soils derived from these rocks are the shallow to moderately deep Ashe, Edneyville, Hayesville, and Tallapoosa soils.

Small areas in the northwestern part of Cherokee County and in the southwestern part of Pickens County are underlain by quartzite and conglomerate. The principal soils derived from these rocks are Dekalb soils. They contain coarse fragments on the surface and in the upper part of the profile.

The south-central part of Cherokee County is underlain by hornblende gneiss. The principal soils derived from these rocks are Gwinnett and Musella soils. They have a dark-red subsoil.

The minerals in the parent material determine to a large extent the amounts and kinds of clay in the soil. Dekalb soils, for example, formed in material weathered from quartzite. Quartzite is high in quartz, a mineral highly resistant to weathering. Dekalb soils therefore are sandy and have faint horizons and a small amount of clay. In contrast, Gwinnett soils formed in material weathered from hornblende gneiss, a rock that contains minerals less resistant to weathering than quartzite. Gwinnett soils contain fairly large amounts of clay. On the other hand, Madison soils also contain large amounts of clay, but the material from which they formed contains considerable muscovite. Muscovite resists weathering so that a large amount of mica is retained in the soil.

Climate

Climate affects the formation of soils through its influence on the rate of weathering of rocks and on the decomposition of minerals and organic matter. It also affects biological activities in the soils and the leaching and movement of weathered materials.

This survey area has a moist, temperate climate. The average annual temperature is about 58° F.; the temperature averages about 41° in January and about 76° in July. The hilly to mountainous areas in the northeastern and northwestern parts of Gilmer and Pickens Counties contribute to local differences in minimum temperature. These differences are reflected in the classification of soils in areas where the average annual temperature is less than 59°. In these areas, particularly on northern slopes, the soils are shallow, partly because of slow weathering and the rocky underlying material.

The warm, moist climate of the middle and southern parts of the survey area promotes rapid weathering of hard rock. Consequently, over much of this area, the soils are 3 to 6 feet deep over loose, disintegrated, weathered rock, underlain by hard rock. About 55 inches of water falls annually. Much of this percolates through the soil and moves dissolved or suspended materials downward so that the soils generally are low in bases. Plant remains decay rapidly and produce organic acids that hasten the breakdown of minerals in the underlying rock. The content of organic matter is low in the surface layer of well-drained soils in the survey area.

Relief

Relief influences soil formation through its effect on runoff, movement of water within the soil, plant cover, and, to some extent, soil temperature.

The length, shape, and steepness of slope determine the rate of runoff. Runoff is more rapid on steep soils than on the level ones. Thus, steep soils erode faster than level ones, even though both soils are of the same material. In this survey area, for example, soils on steep slopes underlain by hard rock, mostly soils of mountainous terrain, are thinner and have a more weakly expressed profile than soils that are forming in similar material on broad, fairly level ridgetops. Also, rock outcrops are more numerous.

A level or nearly level surface allows more time for water to penetrate the soil and to percolate through the soil profile. The amount of water, in turn, influences the solution and translocation of soluble materials. The moisture available in the soil also determines to a significant extent the number and kinds of plants that grow.

This survey area ranges from nearly level along the flood plains to very steep, hilly, and mountainous. The effect of relief on soil temperature is more evident in the mountainous areas. South-facing slopes are warmer than north-facing slopes.

Plants and animals

Plants, animals, bacteria, and other living organisms are active in the soil-forming processes. The changes they bring about depend mainly on the kinds of life processes peculiar to each. The kinds of plants and animals that live on and in the soil are affected, in turn, by the climate, the parent material, the relief, and the age of the soil.

Most of the soils in this survey area formed under a forest cover consisting of various kinds of hardwoods and of such softwoods as pines. These plants supply most of the organic matter available to the soils; the hardwoods contribute more than softwoods. The organic-matter content in most of the soils is low to medium.

The growing plants provide a cover that helps to reduce erosion and stabilize the surface so that the soil-forming processes can continue. Leaves, twigs, roots, and entire plants accumulate on the surface of forest soils and then decompose as the result of the action of percolating water and of micro-organisms, earthworms, and other forms of life. The roots of plants widen cracks in the rocks and thus allow more water to enter the soil. Also, the uprooting of trees by wind influences soil formation through mixing of soil layers and loosening of underlying material.

Small animals, earthworms, insects, and micro-organisms also influence the formation of soils by mixing organic matter into the soil and by helping to break down the remains of plants. Small animals burrow into the soil and thus mix the layers. Earthworms and other small invertebrates feed on the organic matter in the upper few inches. In this way they slowly but continually mix the soil material and may alter it chemically. Bacteria, fungi, and other micro-organisms hasten the weathering of rocks and the decomposition of organic matter.

Time

Generally, a long time is required for a soil to form (*9*). Most of the soils on uplands in this survey area have been in place long enough for distinct horizons to form, but some soils formed in alluvium have been in place too short a time for distinct horizons to form.

Most soils in this area have distinct horizons. Their surface layer has an accumulation of organic matter, and silicate clay minerals have formed and moved downwards so that horizons fairly high in clay have formed. Also, oxidation or reduction of iron has had its effect, according to the natural drainage. Many well-drained soils have a reddish or dark-red subsoil and are high in oxidized iron. A few poorly drained soils have a gray subsoil and are low in oxidized iron. In addition, leaching of soluble calcium, magnesium, potassium, and other weatherable elements has increased the amount of exchangeable hydrogen. Examples of mature soils in this area are the Madison and Gwinnett soils.

Chiefly because of time, two soils essentially the same in parent material and drainage sometimes differ in degree of profile development. Examples are the Augusta soils on stream terraces, and the Toccoa soils on flood plains. These soils developed in material transported by water and occupy similar positions. Augusta soils, which have been in place long enough, have a distinct subsoil that has an accumulation of clay, but Toccoa soils have not been in place long enough for distinct horizons to form.

Classification of the Soils

Classification consists of an orderly grouping of soils according to a system designed to make it easier to remember soil characteristics and interrelationships. Classification is useful in organizing and applying the results of experience and research. Soils are placed in narrow classes for discussion in detailed soil surveys and for application of knowledge within farms and fields. The many thousands of narrow classes are then grouped into progressively fewer and broader classes in successively higher categories, so that information can be applied to large geographic areas.

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (*9*) and revised later (*8*). The system currently used by the National Cooperative Soil Survey was developed in the early sixties (*6*) and was adopted in 1965 (*11*). It is under continual study.

The current system of classification has six categories. Beginning with the most inclusive, these categories are the order, the suborder, the great group, the subgroup, the family, and the series. The criteria for classification are soil properties that are observable or measurable, but the properties are selected so that soils of similar genesis are grouped together. The placement of some soil series in the current system of classification, particularly in families, may change as more precise information becomes available.

Table 9 shows the classification of each soil series of the three counties by family, subgroup, and order.

Following are brief descriptions of each of the categories in the current system.

Order.—Ten soil orders are recognized in the current system. They are Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, and Histosols. The orders are primarily broad climatic groupings. The exceptions, Entisols and Histosols, occur in many different climates. Four of the soil orders—Alfisols, Entisols, Inceptisols, and Ultisols—are represented in the survey area.

Alfisols are mineral soils that have distinct horizons and commonly occur on old land surfaces. They contain a clay-enriched B horizon that has high base saturation.

Entisols are young mineral soils that do not have genetic horizons or have only the beginning of such horizons.

Inceptisols are mineral soils in which genetic horizons have definitely started to develop. They generally are on young but not recent land surfaces.

Ultisols are mineral soils that have a clay-enriched B horizon and 50 inches below the upper boundary of the clay-enriched B horizon have base saturation of less than 35 percent.

Suborder.—Each order is subdivided into suborders, primarily on the basis of soil characteristics that seem to produce classes having the greatest genetic similarity. A suborder has a narrower climatic range than an order. The criteria for suborders reflect either (1) the presence or absence of waterlogging or (2) differences in climate or vegetation.

Great Group.—Each suborder is divided into great groups on the basis of uniformity in kind and sequence of genetic horizons. The horizons considered are those in which clay, iron, or humus has accumulated or those having pans that interfere with the growth of roots or the

TABLE 9.—*Soil series classified according to the current system of classification*

Series	Family	Subgroup	Order
Appling	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Ashe	Coarse-loamy, mixed, mesic	Typic Dystrochrepts	Inceptisols.
Augusta	Fine-loamy, mixed, thermic	Aeric Ochraquults	Ultisols.
Buncombe	Mixed, thermic	Typic Udipsamments	Entisols.
Cartecay	Coarse-loamy, mixed, nonacid, thermic	Aquic Udifluvents	Entisols.
Chewacla	Fine-loamy, mixed, thermic	Aquic Fluventic Dystrochrepts	Inceptisols.
Dekalb	Loamy-skeletal, mixed, mesic	Typic Dystrochrepts	Inceptisols.
Edneyville	Fine-loamy, mixed, mesic	Typic Hapludults	Ultisols.
Grover	Fine-loamy, micaceous, thermic	Typic Hapludults	Ultisols.
Gwinnett	Clayey, kaolinitic, thermic	Typic Rhodudults	Ultisols.
Hayesville	Clayey, kaolinitic, mesic	Typic Hapludults	Ultisols.
Helena	Clayey, mixed, thermic	Aquic Hapludults	Ultisols.
Hiwassee	Clayey, kaolinitic, thermic	Typic Rhodudults	Ultisols.
Madison	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Masada	Fine-loamy, mixed, thermic	Typic Hapludults	Ultisols.
Musella	Fine-loamy, mixed, thermic	Typic Rhodudults	Ultisols.
Porters	Fine-loamy, mixed, mesic	Humic Hapludults	Ultisols.
Starr [1]	Fine-loamy, mixed, thermic	Fluventic Dystrochrepts	Inceptisols.
Talladega	Loamy-skeletal, mixed, mesic	Ruptic Lithic Hapludults	Ultisols.
Tallapoosa	Loamy, micaceous, thermic, shallow	Ochreptic Hapludults	Ultisols.
Toccoa	Coarse-loamy, mixed, nonacid, thermic	Typic Udifluvents	Entisols.
Tusquitee	Fine-loamy, mixed, mesic	Humic Hapludults	Ultisols.
Wehadkee	Fine-loamy, mixed, nonacid, thermic	Typic Fluvaquents	Entisols.
Wickham	Fine-loamy, mixed, thermic	Typic Hapludults	Ultisols.
Wilkes	Loamy, mixed, thermic, shallow	Typic Hapludalfs	Alfisols.
Worsham	Clayey, mixed, thermic	Typic Ochraquults	Ultisols.

[1] The Starr soils in this survey area are taxadjuncts to the Starr series. They are less red than is appropriate to the classification shown

movement of water. Among the features considered are the self-mulching properties of clay, the soil temperature, and the major differences in chemical composition, mainly calcium, magnesium, sodium, and potassium.

Subgroup.—Each great group is divided into subgroups, one representing the central (typic) segment of the group, and others, called intergrades, that have properties of one great group and also one or more properties of another great group, suborder, or order.

Family.—Families are established within each subgroup primarily on the basis of properties important to the growth of plants or the behavior of soils used for engineering. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence.

Series.—The series has the narrowest range of characteristics of the classes in the classification system. It is explained in the section "How This Survey Was Made." Detailed descriptions of each soil series in the survey area are given in the section "Descriptions of the Soils."

New soil series must be established and concepts of some established series, especially older ones that have been used little in recent years, must be revised in the course of the soil survey program. A proposed new series has tentative status until review of the series concept at national, State, and regional levels of responsibility for soil classification results in a judgment that the new series should be established. Except for the Cartecay and Toccoa series, all of the soil series described in this publication were established before this survey was made.

Additional Facts About the Counties

This section tells about the physiography, relief, and drainage and gives facts about the climate and water supply.

Physiography, Relief, and Drainage

Most of this survey area is in the extreme northern part of the Southern Piedmont Major Land Resource Area. Areas in the western, northern, and eastern parts of Gilmer County are in the Blue Ridge Major Land Resource Area. The relief ranges from nearly level areas along flood plains and stream terraces to irregular rolling ridges and steep mountains.

The elevation ranges from 1,000 feet in Woodstock, in Cherokee County, to about 2,000 feet in Gilmer County, except for Big Bald Mountain, which rises to a height of 4,000 feet.

The Coosawattee and Etowah Rivers are the main drainage basins for the survey area. The chief tributaries of the Coosawattee River that drain Gilmer County and parts of Pickens County are Mountaintown Creek, the Ellijah River, Cartecay River, and Talking Rock Creek. The larger tributaries of the Etowah River that drain the southern part of Pickens County and Cherokee County are Long Swamp Creek, Canton Creek, and Little River. Salacoa Creek drains the northwestern part of Cherokee County and flows into the Oostanaula River.

Water Supply

This survey area has an abundant supply of fresh water. The many natural cold water springs are the source for numerous creeks that supply the Coosawattee and Etowah Rivers. The supply is adequate for household and livestock use in all parts of the survey area.

Most farm homes are supplied with water where dug wells and springs are equipped with electric pumps. Branches, creeks, larger streams, and farm ponds are the main sources of water for cattle and other livestock. Many poultry houses are served with water by means of natural gravity. In recent years many country homes have been supplied by municipal water systems. Water is obtained from rivers and creeks.

Climate [6]

The climate of Cherokee, Gilmer, and Pickens Counties is influenced by latitude, by the Blue Ridge Mountains, and by warm water from the Gulf of Mexico and the Atlantic Ocean. The climate is also influenced by the elevation and the terrain. Elevation ranges from less than 1,000 feet in southern Cherokee County to about 4,000 feet on some of the higher mountains in northeast Gilmer County. The increase in elevation from south to north is not uniform. Table 10 gives data on temperature and precipitation in the three counties.

The hilly to mountainous terrain has a great influence on the temperature in the area. Summers are unusually mild, especially in the more mountainous part. Maximum temperatures are as high as 90° F. on only about 1 day out of 3 in summer. Minimum temperatures average about 64°. Maximum temperatures have reached 100° at Jasper, in Pickens County, in only 5 of the last 25 summers. Cooling is rapid after sunset; early morning temperatures are usually in the low to middle sixties.

Winters are cold, especially in the mountainous northern part. Minimum temperatures are 32° or lower on 64 days during an average winter in the central part of the survey area. Extreme temperatures in winter vary considerably from south to north. Readings of zero or lower are likely in the extreme northern part but occur in only 1 year in 6 in the southern part.

The hilly to mountainous terrain also results in large local variations in minimum temperature. On clear, calm nights, cooled air drains downslope into lower areas and is replaced by warmer air from above. The minimum temperatures may be 10° to 15° colder in the lower areas than on the surrounding hillsides. Slope orientation also influences the local temperature. South-facing slopes are ordinarily warmer than north-facing slopes.

Probabilities of last freezing temperatures in spring and first in fall are given in table 11. The average length of the growing season shows large local variations. On the average, the last freeze in spring and the first in fall occur early in April and early in November, respectively, in the southern part of this area. The average length of the growing season is about 215 days. The length of the period drops to 180 days in northern Gilmer County. In all areas the length of the season is longer along the southern slopes and shorter in the colder valleys.

[6] By HORACE S. CARTER, State climatologist, National Weather Service, Athens, Ga.

TABLE 10.—*Temperature and precipitation data*

Month	Temperature				Precipitation		
	Average daily maximum	Average daily minimum	Two years in 10 will have at least 4 days with—		Average total	One year in 10 will have—	
			Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		Less than—	More than—
	°F.	°F.	°F.	°F.	Inches	Inches	Inches
January	51. 3	32. 3	65	15	5. 19	2. 7	9. 3
February	54. 8	33. 9	69	20	5. 65	2. 1	10. 0
March	61. 1	39. 0	78	25	6. 71	4. 6	10. 2
April	71. 7	47. 7	84	33	5. 33	2. 4	10. 0
May	79. 5	55. 4	89	42	3. 86	1. 5	7. 0
June	85. 2	62. 1	95	54	3. 98	1. 7	6. 8
July	87. 5	65. 5	95	60	5. 39	1. 8	9. 7
August	87. 4	64. 8	95	58	3. 76	1. 5	6. 0
September	82. 0	60. 0	92	50	3. 86	1. 1	6. 8
October	72. 9	49. 1	83	33	2. 67	. 4	6. 8
November	61. 5	39. 7	75	25	3. 77	1. 0	6. 4
December	51. 9	33. 0	65	16	5. 09	2. 5	9. 6
Year	70. 6	48. 5	[1] 97	[1] 10	55. 26	44. 5	64. 4

[1] The extreme temperature that will be equalled or exceeded on at least 4 days in 2 years out of 10.

TABLE 11.—*Probabilities of last freezing temperatures in spring and first in fall*

Probability	Dates of given probability at temperature of—		
	24° F. or lower	28° F. or lower	32° F. or lower
Spring:			
1 year in 10 later than	Mar. 30	Apr. 18	Apr. 21
2 years in 10 later than	Mar. 24	Apr. 10	Apr. 17
5 years in 10 later than	Mar. 7	Mar. 28	Apr. 10
Fall:			
1 year in 10 earlier than	Nov. 3	Oct. 22	Oct. 18
2 years in 10 earlier than	Nov. 5	Oct. 26	Oct. 22
5 years in 10 earlier than	Nov. 22	Nov. 7	Nov. 3

Precipitation is usually ample. It ranges from just a little more than 50 inches in southern Cherokee County to about 65 inches in parts of northern Gilmer County. Slope aspect results in significant variations in precipitation, especially in the more mountainous parts. Slopes facing south and southeast as a rule receive the greatest amount of precipitation. Rainfall is well distributed. Winter and early spring are the wettest parts of the year. About 41 percent of the annual total rainfall occurs in the 4 months, December through March. March has the highest average, and October, normally the driest month, averages more than 2½ inches.

Snow contributes to the precipitation in the mountainous north, but large amounts occur infrequently in the southern part. There is some accumulation on the ground at the higher elevations during most winters.

Average windspeed is usually lower in the mountains than in most other parts of Georgia. Wind directions vary considerably within short distances because of the hilly terrain. Tornadoes have occurred in each of the three counties but have been more frequent in the southern section. Thunderstorms, occasionally accompanied by strong winds and hail, occur quite frequently.

Literature Cited

(1) ABERCROMBIE, W. F.
1954. A SYSTEM OF SOIL CLASSIFICATION. Highway Res. Bd. Proc. Pub. 324, pp. 509–514, illus.

(2) AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS.
1961. STANDARD SPECIFICATIONS FOR HIGHWAY MATERIALS AND METHODS OF SAMPLING AND TESTING. Ed. 8, 2 v., illus.

(3) BOSWELL, F. C., ANDERSON, O. E., AND STACY, S. V.
1959. SOME EFFECTS OF IRRIGATION, NITROGEN AND PLANT POPULATION ON CORN. Ga. Agr. Expt. Sta. Bul. N.S. 60, 51 pp., illus.

(4) GEORGIA DEPARTMENT OF PUBLIC HEALTH.
1964. RECOMMENDATIONS FOR THE DESIGN, OPERATION, AND MAINTENANCE OF SEWAGE OXIDATION PONDS. 20 pp., illus.

(5) GEORGIA DIVISION OF MINES, MINING AND GEOLOGY.
1939. GEOLOGIC MAP OF GEORGIA. Prepared by Ga. Div. of Mines, Mining and Geol., in cooperation with the U.S. Dept. of Int., Geol. Survey, 1 p.

(6) SIMONSON, ROY W.
1962. SOIL CLASSIFICATION IN TNE UNITED STATES. Sci. 137: 1027–1034, illus.

(7) SMITH, GEORGE E., JR.
1966. SOIL SURVEY AS A TOOL FOR FOREST MANAGERS. Soil Conservation, v. 32, No. 2.

(8) THORP, JAMES, and SMITH, GUY D.
1949. HIGHER CATEGORIES OF SOIL CLASSIFICATION: ORDER, SUBORDER, AND GREAT SOIL GROUPS. Soil Sci. 67: 117–126.

(9) UNITED STATES DEPARTMENT OF AGRICULTURE.
1938. SOILS AND MEN. U.S. Dept. Agr. Ybk., pp. 979–1001, illus.

(10) ———
1951. SOIL SURVEY MANUAL. U.S. Dept. Agr. Handbook No. 18, 503 pp., illus.
(11) ———
1960. SOIL CLASSIFICATION, A COMPREHENSIVE SYSTEM, 7TH APPROXIMATION. 265 pp., illus. [Supplements issued in March 1967 and September 1968]
(12) UNITED STATES DEPARTMENT OF DEFENSE.
1968. UNIFIED SOIL CLASSIFICATION SYSTEM FOR ROADS, AIRFIELDS, EMBANKMENTS AND FOUNDATIONS. MIL–STD–619B, 30 pp., illus.
(13) UNITED STATES DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE.
1957. MANUAL OF SEPTIC-TANK PRACTICES. Public Health Service. Pub. No. 526, 93 pp., illus. (Reprinted 1963.)
(14) UNITED STATES DEPARTMENT OF THE INTERIOR.
1966. FEDERAL ASSISTANCE IN OUTDOOR RECREATION. Bureau of Outdoor Recreation. No. 1, 83 pp. (Revised 1966.)

Glossary

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available water capacity. The capacity of a soil to hold water in a form available to plants. Amount of moisture held in soil between field capacity, or about one-third atmosphere of tension, and the wilting coefficient, or about 15 atmospheres of tension.

Channery soil. A soil that contains thin, flat fragments of sandstone, limestone, or schist, as much as 6 inches in length along the longer axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Claypan. A compact, slowly permeable soil horizon that contains more clay than the horizon above and below it. A claypan is commonly hard when dry and plastic or stiff when wet.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds, or of soil grains cemented together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry, or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents.

Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rains. The distinction between gully and rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by normal tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage. V-shaped gullies result if the material is more difficult to erode with depth; whereas U-shaped gullies result if the lower material is more easily eroded than that above it.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Infiltration. The downward entry of water into the immediate surface of the soil, as contrasted with percolation, which is the movement of water through the soil.

Mineral soil. A soil in which properties are dominated by the mineral matter, generally containing less than 20 percent organic matter, or with only a thin surface organic layer less than 30 centimeters thick.

Munsell notation. A system for designating color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with a hue of 10YR, a value of 6, and a chroma of 4.

Permeability, soil. The rate at which water penetrates or passes through a soil mass or soil horizon. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock. Only the upper part of this, modified by organisms and other soil-building forces, is regarded by soil scientists as soil. Most American engineers speak of the whole regolith, even to great depths, as "soil."

Residual material. Unconsolidated, partly weathered mineral material that accumulates over disintegrating solid rock; residual material is not soil but is frequently the material in which a soil forms.

Sand. Individual rock or mineral fragments in soils having diameters ranging from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are (1) *single grain* (each grain by itself, as in dune sand) or (2) *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Topsoil. A presumed fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

Weathering. All physical and chemical changes produced in rocks, at or near the earth's surface, by atmospheric agents. These changes result in more or less complete disintegration and decomposition.

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and the soil series to which the mapping unit belongs. Information is given in tables as follows:

Approximate acreage and proportionate extent of soils, table 1, p. 7.
Limitations of soils in town and country planning, table 2, p. 32.
Use of the soils in engineering, tables, 3, 4, and 5, pp. 44 through 55.
Use of the soils as woodland, table 6, p. 56.
Estimated yields, table 7, p. 63.
Suitability of soils as wildlife habitat, table 8, p. 65.

Map symbol	Mapping unit	Described on page	Capability unit	
			Symbol	Page
AcG	Ashe stony loam, 60 to 80 percent slopes	10	VIIs-1	62
AEE	Ashe and Edneyville stony loams, 10 to 25 percent slopes	10	VIIs-1	62
AEF	Ashe and Edneyville stony loams, 25 to 60 percent slopes	10	VIIs-1	62
Afs	Augusta fine sandy loam	11	IIIw-3	61
Ajc	Alluvial land, cobbly	9	IIIw-2	60
AmB2	Appling sandy loam, 2 to 6 percent slopes, eroded	9	IIe-2	59
AmC2	Appling sandy loam, 6 to 10 percent slopes, eroded	9	IIIe-2	60
AmD2	Appling sandy loam, 10 to 15 percent slopes, eroded	9	IVe-1	61
Bfs	Buncombe loamy sand	12	IIIs-1	60
Chc	Chewacla-Cartecay complex	13	IIIw-2	60
DtD	Dekalb flaggy fine sandy loam, 6 to 15 percent slopes	14	VIe-3	62
DuE	Dekalb stony fine sandy loam, 15 to 25 percent slopes	15	VIIe-3	62
DuF	Dekalb stony fine sandy loam, 25 to 60 percent slopes	15	VIIe-3	62
GdB2	Gwinnett sandy clay loam, 2 to 6 percent slopes, eroded	17	IIe-1	59
GdD3	Gwinnett sandy clay loam, 6 to 15 percent slopes, severely eroded	17	IVe-1	61
GdE3	Gwinnett sandy clay loam, 15 to 25 percent slopes, severely eroded	17	VIe-2	62
GgB2	Gwinnett loam, 2 to 6 percent slopes, eroded	16	IIe-1	59
GgC2	Gwinnett loam, 6 to 10 percent slopes, eroded	17	IIIe-1	59
GgE2	Gwinnett loam, 10 to 25 percent slopes, eroded	17	VIe-2	62
GiB	Grover fine sandy loam, 2 to 6 percent slopes	16	IIe-2	59
GiC2	Grover fine sandy loam, 6 to 10 percent slopes, eroded	16	IIIe-2	60
GiD	Grover fine sandy loam, 10 to 15 percent slopes	16	IVe-1	61
HIB	Hayesville fine sandy loam, 2 to 6 percent slopes	18	IIe-2	59
HIC	Hayesville fine sandy loam, 6 to 10 percent slopes	18	IIIe-2	60
HIE	Hayesville fine sandy loam, 10 to 25 percent slopes	18	VIe-1	61
HJC3	Hayesville sandy clay loam, 2 to 10 percent slopes, severely eroded	18	IVe-1	61
HJE3	Hayesville sandy clay loam, 10 to 25 percent slopes, severely eroded	18	VIIe-1	62
HSB	Hiwassee loam, 2 to 6 percent slopes	19	IIe-1	59
HSC	Hiwassee loam, 6 to 10 percent slopes	19	IIIe-1	59
HTD3	Hiwassee clay loam, 6 to 15 percent slopes, severely eroded	20	IVe-1	61
HYC	Helena sandy loam, 2 to 10 percent slopes	19	IIIe-4	60
MCE	Musella cobbly loam, 10 to 25 percent slopes	22	VIIe-2	62
MiC2	Madison gravelly sandy clay loam, 2 to 10 percent slopes, eroded	20	IIIe-1	59
MjB	Madison fine sandy loam, 2 to 6 percent slopes	20	IIe-1	59
MjC	Madison fine sandy loam, 6 to 10 percent slopes	20	IIIe-1	59
MjD	Madison fine sandy loam, 10 to 15 percent slopes	21	IVe-1	61
MoA	Masada fine sandy loam, 0 to 2 percent slopes	22	I-2	58
MoB	Masada fine sandy loam, 2 to 6 percent slopes	22	IIe-2	59
MoC2	Masada fine sandy loam, 6 to 10 percent slopes, eroded	22	IIIe-2	60
MpC	Masada gravelly loam, 2 to 10 percent slopes	21	IIIe-2	60
MyD2	Masada sandy clay loam, 10 to 15 percent slopes, eroded	22	IVe-1	61
PcD	Porters loam, 6 to 15 percent slopes	23	IVe-1	61
Roc	Rock land	23	VIIIs-1	63
Sta	Starr fine sandy loam	24	I-1	58
TbE	Tallapoosa cobbly sandy loam, 10 to 25 percent slopes	25	VIIs-1	62
TbF	Tallapoosa cobbly sandy loam, 25 to 60 percent slopes	25	VIIs-1	62
TcD	Tallapoosa fine sandy loam, 6 to 15 percent slopes	25	VIe-3	62
TcE	Tallapoosa fine sandy loam, 15 to 25 percent slopes	26	VIIe-2	62
TeG	Talladega flaggy loam, 60 to 80 percent slopes	24	VIIs-1	62
ThE2	Tallapoosa gravelly sandy clay loam, 10 to 25 percent slopes, eroded	26	VIIe-2	62

Map symbol	Mapping unit	Described on page	Capability unit	
			Symbol	Page
TjF	Tallapoosa channery sandy loam, 25 to 60 percent slopes	25	VIIs-1	62
TlB	Tusquitee loam, 2 to 6 percent slopes	27	IIe-1	59
TlC	Tusquitee loam, 6 to 10 percent slopes	28	IIIe-1	59
TlE	Tusquitee loam, 10 to 25 percent slopes	28	VIe-1	61
TmE	Tusquitee stony loam, 10 to 25 percent slopes	27	VIIs-1	62
Toe	Toccoa complex	26	IIw-2	59
TRE	Talladega channery loam, 10 to 25 percent slopes	24	VIIs-1	62
TRF	Talladega channery loam, 25 to 60 percent slopes	25	VIIs-1	62
Wht	Wehadkee loam	28	IVw-1	61
WgB	Wickham fine sandy loam, 2 to 6 percent slopes	29	IIe-1	59
WgC2	Wickham fine sandy loam, 6 to 10 percent slopes, eroded	29	IIIe-1	59
WgE2	Wickham fine sandy loam, 10 to 25 percent slopes, eroded	29	VIe-2	62
Wks	Worsham fine sandy loam	31	Vw-1	61
WnC3	Wickham sandy clay loam, 2 to 10 percent slopes, severely eroded	29	IVe-1	61
WnE3	Wickham sandy clay loam, 10 to 25 percent slopes, severely eroded	29	VIIe-1	62
WpD	Wilkes complex, 5 to 15 percent slopes	30	VIe-3	62

NRCS Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at 1-800-457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.